

# YOUR **COMMODORE**

AN ARSUS SPECIALIST PUBLICATION

APRIL 1987 £1.10



## SPLIT SPRITE

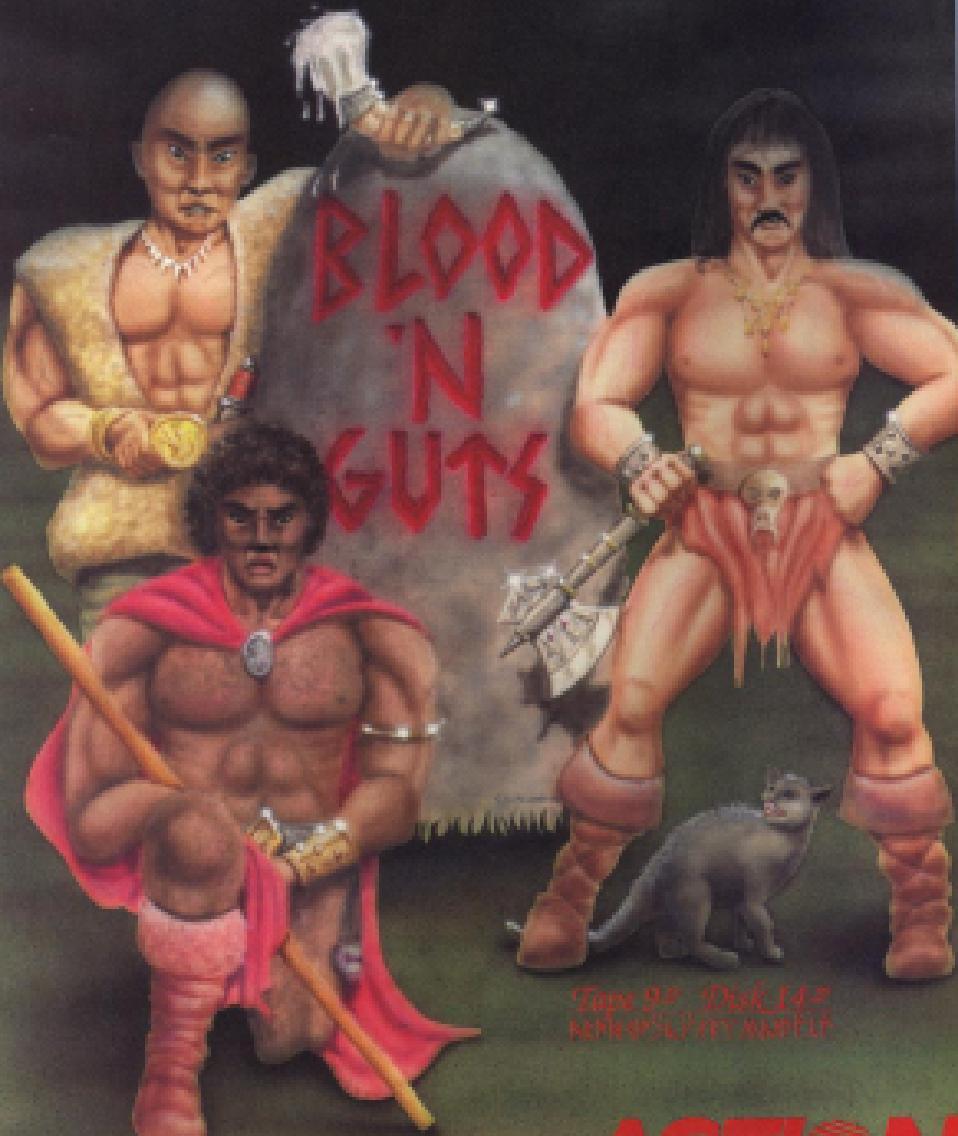
UP TO 32  
SPRITES ON  
YOUR C64

ARCADE ADVICE FROM  
T. GROWTHIER

■ 50 C16 GAMES TO BE WON ■ CRIBBAGE ON THE  
PLUS/4 ■ PROTECTOR-PROGRAM SCRAMBLER ■







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# GRANGE HILL - THE GAME



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# DATA STATEMENTS

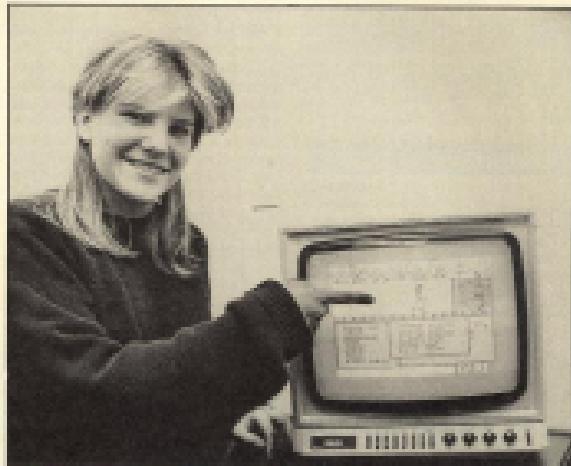
## APS at School

Argus Press Software is soon to release the official Orange Hill game, entitled *Orange Hill* - the Computer Game. Spin off of the long running TV series about a comprehensive school, the game casts you in the part of Luke 'Gonzo' Gardner.

The scenario is the darkened school, closed for the night. However, within the confines of the staff room, lies your Walkman, confiscated earlier during class. You cannot return without it for fear of the wrath of your teacher. So, you have to get it back. What better idea than to break into the school after everyone else has left, find your way to the staffroom and claim your lost property? Well, it may sound a little far-fetched but that's the general idea.

With the aid of your pal, Hallo Holloway (presumably supporting this endeavour because he has even less brain than you), you aim to complete your dirty deed by midnight otherwise your mark will go spare.

This adventure has a large number of locations and contains arcade elements as you guide the characters with the keyboard or joystick. It should be in the shops now and is



Judy Imrie

£9.99 on cassette.

Also look out for these other titles, coming soon on APS labels: *Wishbone*, *Agent Orange*, *Circus Maximus*, *World War One*, *Stellar Holocaust*, *Roundheads* and *The Hunt for Red*.

*Overdrive*. All are for the C64.

### Teachers

*Argus Press Software*, Pirity House, Leicestershire, LE11 8RN.  
Tel: 0116 348 0668.

## Miscellaneous Software

Finally a look at a few games winging their way to your local shops even as we speak.

*Kraibird* is releasing a new level 9 adventure for the C64 entitled *Faigle the Fox*. It casts you as an experienced agent on getting your own back on the humans who have subjugated your people for generations. State of the art digitised graphics are an impressive visual feature of the new adventure. Out soon.

*Academy*, from CRL, is due to be launched for the C64 in the spring. Continuing the theme of *Tie-Craft*, *Academy* scrolls you in the top secret training school of the Galooper for skimmer pilots. You have to learn to design your own space ship, and participate in all the classes needed to qualify to become a full fledged skimmer pilot. It will be available on



cassette and disk at £19.99 and £14.99 respectively.

*Ariolasoft* has a bargain package for the C16. *Ford Racer and Helipac* is a two-games-in-one cassette for only £9.99.

Also from Ariolasoft is *Killer Ring*, the latest Tony Crowther game on Commodore 64 cassette (£19.99) and

disk (£22.99). The inbox card features a special recipe for K-Ring cup cakes.

*Blaizeberg*, a C64 game based on the Len Deighton thriller of the same name, will also be available for the C64 from Ariolasoft in the near future. Based on the assault against Berlin in World War Two, you lead the German forces in a game of strategy and action.

C16 users are still being supported handsomely by Grendel, and a new release for this machine is on its way to the shelves. *The Way of the Tiger*, based on the fighting fantasy series of books of the same name, combines strategy, action and unique animation. It features three action packed levels, superb sound effects and inspiring backdrops'. Times for £9.99.

### Teachers

*Grendel*, Five Floor, 22 New Oxford

Street, London WC1A 1PS. Tel: 01 240 8819.

**CLR:** CLR House, 9 Kings Road, Carpenters Road, London E11 2PN. Tel: 01 522 2981.

**Activision:** 65 Long Acre, Covent Garden, London WC2E 8RD. Tel: 01 522 5411.

**Grenada:** Glyde House, 18 Curzon Street, Sheffield S1 4PS. Tel: 0742 274424.

### Links On Line

**W**ho says computer owners aren't romantic at heart? News has recently come in of the first online engagement on CompuServe.

The couple are Paul Hasell and Margaret Narbey. They were introduced by Carol, Margaret's mother. She said "I was chatting to Paul on Party-Line at Christmas and he sounded a bit down, so I thought Margaret ought to check him up".

A five hour party-line session lead to a phone call and then Paul made the journey from his home town in Winterbourne near Bristol, to Leeds, Margaret's home, where they met face to face for the first time. Soon afterwards Margaret surprised her family with a diamond and sapphire engagement ring. The couple plan to marry in about two years.

Margaret's father Chris said: "When I bought a modem, I didn't bargain for a wedding".

Paul summed up the couple's feelings about their romance: "It's thanks to CompuServe. Living 240 miles apart, we'd never have met if it hadn't been for Party-Line".

On to the more serious aspect of communications, BT's Electronic Yellow Pages (ETYP) went live in early January, allowing most centre communicating terminals in the UK and abroad free access to a database of Yellow Pages' advertisers.

Initial information covers the whole of London, Reading, Guildford, Watford and St Albans.

In areas where the 1987 edition of Yellow Pages are not available until later in the year, users interested should ring the ETYP Helpline (see Toadline) for a free copy of the user instructions.

**Toadline:**

CompuServe 81 943 8864.

ETYP Helpline: 0753 566150.

### Sports Pick

New from Activision is an America's Cup game, simply and appropriately titled *Sailing*.

It's a game of strategy and simulation designed to capture the thrill of competing in top level sailing competitions. Even before you start racing you have to design the boat that will get you across the finishing line first.

You can choose overall length, waterline length, freeboard and mast length as well as adding wings to your keel and changing the hull material. Once you've named this boat and made your allegiance to a particular nation then you're ready to compete.

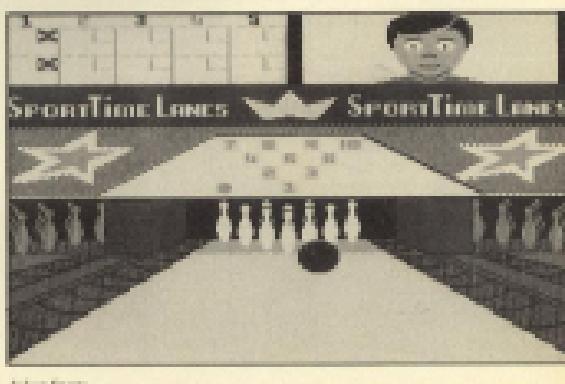
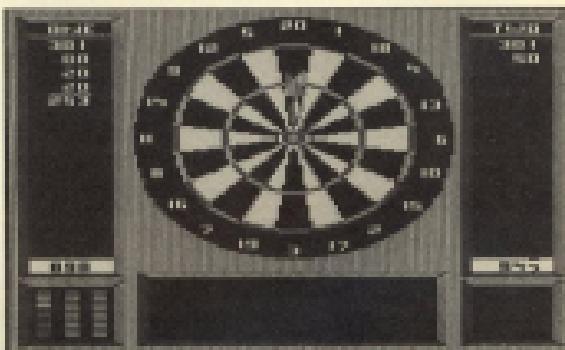
The display is split into two halves, the top shows the press out over the sea, so that you can see if your

opponent is ahead. The bottom contains your gauges which you need to monitor closely to get the best from your boat. It's available for the Commodore 64 at £9.99 cassette and £14.99 disk.

Four sports games in one are available from Advance Promotions in the form of a new release entitled *Indoor Sports*. The four sports featured on the cassette for C64 are *All Pro Bowling*, *Ali's Hockey*, *Tennis Tennis* and *Boris*. The Commodore 64 version is £8.95 and Advance claims that all the games could stand alone at full price.

**Toadline:**

Activision 21 Royal St, Hammersmith, London NW2 2PM. Tel: 01 521 1303. Advance 17 Knights Tor, Hartland, Exeter EX9 7LE. Tel: 0379 42294.



*Indoor Sports*

## Packet Money

A new range of budget games has recently been launched by Miles Marketing. There are two initial releases on the new label: *X29 Fighter Mission* for the C64 and *Space 2* for the C16. Both are priced at £2.99.

*X29 Fighter Mission* is essentially a flight and combat simulator. Your fighter must be flown with skill and daring to avoid the constant onslaught of enemy fire and heat seeking missiles. At the same time you must concentrate on destroying the enemy craft.

*Space 2* is a combination of shoot 'em up action and skill and nerve in manoeuvring a large space craft through dark caverns. There are two programs on *Space 2*. *The Last Galaxy*, involves a lost starship trying to return to the motherhip. However, there are the inevitable galactic mutations trying to hinder your journey.

*Star 2* is the second program where you must guide your large fuel supply vessel to stranded scientists on the planet Vargon. They are situated deep underground so you need to negotiate the treacherous routes through caverns strewn with strange obstacles.

Mastertronic is also launching a new title named *Bulldog* (not of British).

The company claims to have commissioned some startling original graphics for the new label which will have a distinct identity to complement the existing Mastertronic £1.99 and £2.99 range. The first title, already in the shops, is *Fred*, at £1.99.

## Drives and Data Recorders

The *Ekosuper 2000*, the only available alternative to Commodore's own series of disk drives, although stable and reasonably priced, has always suffered from compatibility problems. Now Everlast Micros claims to have solved this.

Everlast claims that on the enhanced version of the *Ekosuper*, all disk surfaces and virtually all disk protection schemes can be handled without a problem.

Priced at £149.95 (fully inclusive) and in option to purchase with Future Power MC60 and 10 disks for £179.95, Everlast reports high demand from all quarters.

At the moment supply is restricted

Recently formed Budget House, Code Masters, has just announced a competition for buyers of Code Masters games. Anyone buying a Codemasters game will get an entry form to the BMCA competition. All you have to do is copy the letter which has been derived from a screen shot of the Code Master game *ARM Simulator*. Entries are only limited to the number of Code masters games per buyer. Hurry, because the competition closes on 31 March 1987 and the prize is a 20" Sony Trinitron colour TV.

Other new pocket money priced games are *Wolfe Pursuit* on the Pinball Silver (£1.99 label) and *Cyber 1* on the Superquad label from CDS at £1.99. Both are for the C64.

## Touchline

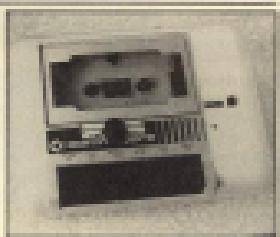
**Miles Marketing**: 21 West Hill Drive, Keyworth, Nottinghamshire NG10 2LA. Tel: 0115 82513.

**Mastertronic**: 8-10 Paul Street, London EC2A 4BH. Tel: 01 377 8889.

**Code Masters**: 1 Beaumont Business Centre, Beaumont Close, Buntingford, Herts, WD18 1AT.

**Freelord**: First Floor, 24 New Oxford Street, London, WC1A 1PS. Tel: 01 240 8082.

**Supersoft**: CDS, Unit A12, Armstrong Mill, Southwood Summit Centre, Southwood, Farnborough, Hants, GU14 4NP. Tel: 023 222509.



to mail order, unless you call in at one of Everlast's two branches. However, Everlast hopes to expand availability to other retailers in the near future.

For those still struggling with data recorders, you may be interested in the *Laud-It* system.

The system works in the following way: a small slot is cut in the case to allow the datafinder adjuster to move forward and backwards as play and stop are requested. A knob is attached to a threaded shaft which replaces the azimuth screw allowing an adjustment of 180 degrees. Sound is also fitted for the Commodore 64 allowing the user to adjust to the clearest data signal. For the technically minded there is a C64 kit available. If you're interested, then contact the address in Touchline for more information.

## Touchline

**Touchline**: Address: 21 Bridge Street, Evesham, Worcs WR1 1AS. Tel: 0386 47689.

**Landline**: 12 Station Road, Shirley, Solihull, W Midlands B90 2EJ. Tel: 021 741 4976.

## Notes on Utilities

Supersoft, the company which has ardently supported the PET series from the beginning, has now fulfilled a recent promise to continue to provide software for these machines.

**Fast Copy** is a disk copying facility for the 8032 and 8150 drives which can drastically reduce the time it takes to make vital check-up copies of data disks. It saves time by omitting the formatting process on an already formatted disk and by copying only those blocks that have been used. Available at the low cost of £15 (ex VAT).

**B20** is a Basic compiler for the 3032, 4032, 5032 and 6032 computer. B20 has been available in Europe for some time and has now been licensed to Supersoft in the UK. Compiled programs run fast, 10 or even 20 times faster with A64 and since they are impossible to alter by anyone who hasn't got access to the uncompiled original, they are also more secure.

B20 costs £99.10 (ex VAT) and comes with a comprehensive manual. Additional versions on the same disk are only £30 extra, so for example the 8032 and 5032/6032 version would be £129 altogether.

**Fast Copy** and **B20** are available from Supersoft or on order from your local computer store.

Staying with utilities but moving to

the C64, Systems Software has recently published *Oxford BASIC*. This is a complete C64 Basic programming environment and gives the user a full library of powerful utilities including: *Oxford Analyse*, a report-optimisation utility; the *Compressor* which eliminates line containing spaces and IBM, the *Totaller* which introduces new commands; the *Cmp* a fast fully compatible Basic compiler to give you the speed and professionalism of machine code without an assembler. The all-inclusive price is £34.95.

#### Freelance

**Supergame**: Winchester House, Cassing Road, Wokingham, Berks, RG10 7SU. Tel: 01 871 7165.

**Systems Software**: 108 Winchester Park, Oxford, OX1 2BW. Tel: 8863 5470.

#### Potential Millionaires Wanted

American software company MicroProse, which has recently established a UK base, is looking for

Computer software writers with the potential to become millionaires overnight.

The man behind the firm is Steven Barnard, MicroProse software development manager. He said "We believe that the UK has the best Commodore software writers. And my job is to find them and offer them, not only money, but international recognition".

MicroProse in the US spends in excess of \$1 million in developing its software programs. However, Steven is not just looking for simulation specialists, he also wants programmers of top quality arcade games.

Barnard revealed his reasons for believing that successful applicants may soon gain millionaire status. "MicroProse titles remain at the top of the US charts, literally for years. And that translates into a lot of royalties, besides substantial advances. So I don't think it would be unfair to claim that if we can find someone who can write simulation like *Silent Service*, they could be a millionaire almost

overnight".

MicroProse has an extensive list of simulation programs, the latest of these, due for imminent release, is *Gunsip* for the C64/128, £14.95 cassette, £19.95 disk.

*Gunsip* is an accurate simulation of the Hughes AH-64 Apache combat helicopter - one of the most lethal weapons in the modern military arsenal.

*Gunsip* is the result of extensive research and the culmination of ten years of programming and games design. It was held back from release until military helicopter pilots had actually test-flown *Gunsip* themselves. Now the US Army use it to train test pilots, attacking sensors to their bodies to measure reactions. Tel:

#### Freelance

**MicroProse**: 2 Market Place, Tiverton, Devonshire EX16 5AD. Tel: 8666 5470.

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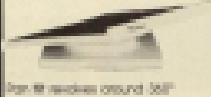
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# Stop Press! What's so special about The Amiga, The Mac, The Atari St., Windows and Gem?

It's no surprise that nearly all new 16 bit 'state of the art' mixers now come with a Mouse and Wimp environment (Windows, Icons, Menus and Pointers) as standard.

With the COMMODORE 64 you already own one of the classic micros and by simply adding the AMX Mouse and 'Stop Press' you can achieve the same ease of use, freedom and versatility of much more sophisticated computers.

The AMX Mouse with Desktop Publishing software - it's what you and your COMMODORE micro have been missing!



ANSWER: **W**HO **E**VER **P**AYS **C**OMES **U**NDER **T**HIS **G**UN

There's not much joy in a joystick and keyboards can be a bit tiresome and clumsy. Acclaimed by the press as 'the best input device', already over 100,000 Amiga owners have adopted an AMX Mouse. The AMX Mouse combined with Stop & Go software will make the most of the benefits of the Amiga's multi-tasking capabilities.

All long last you can graduate newspapers, posters, leaflets, notices and handouts in your own school, home or office. We're not talking about amateurish results, but about seriously professional work with top text and dazzling graphics. Available for the Commodore 64, 128 and 128G.

卷之三

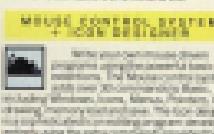
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卷之三

 The most significant political development of the Commonwealth this year involved the Commonwealth, long gone but not forgotten, the former British-ruled territories and colonies throughout the world. The Commonwealth, which originated in 1949, has been instrumental in advancing democracy and human rights.



This support product is available now from all good hardware dealers or direct from us. Address inquiries to: **Ward Manufacturing Company**, 1000 South Main Street, P.O. Box 1000, Salt Lake City, Utah 84111.



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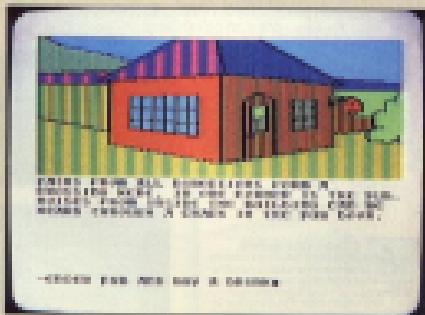
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Microsoft's former trademark application for its search engine has been rejected by the European Patent Office.

# I.Q.

*More and more people are turning to games which need grey matter rather than thumb power on a joystick. Here's another exciting selection to tax your mind.*

**A**dventures can sometimes seem rather daunting to the uninitiated. Apart from the necessity of learning adventuristspeak and the all important mapping technique, there's the bigger problem of mind bending puzzles to solve. All this could easily turn away the average punter, however we've decided to have a look at a couple of programs from Amsoft which may help to break you in gently so that you can cultivate the adventure bug.



## THE PHILOSOPHER'S STONE

**C**ommodore machines aren't the exclusive preserve of Britches and our US Buddies, Europe is a hotbed of Commodore enthusiasts and Germany is perhaps the heart of this trend. It is fitting then that this game from Ariolasoft originally started life there. Actually called *Light Philosophorum*, but translated for non-classics, this is an ideal starting point for new adventurers and an interesting diversion for more experienced addicts, unfortunately only available for C64 and 128 disk users.

The basic storyline concerns a megalomaniac king, King Glaudor, whose stepson has been systematically poisoning him. The only hope left is the old boy in the Philosopher's Stone which has the fantastic powers of turning base metals into gold and curing all ill no boot.

Your character is that of an ageing alchemist. You have found clues to the whereabouts of the fabulous stone in a

book in your loft (where else?). So you set out to get hold of it. Make sure that you explore your home town thoroughly first. Leaving town may be a problem as the prince has discovered the nature of your quest and the guards are ordered to detain you, however, with the right object you can hypnotise them into letting you pass.

One distinct advantage for new initiates are the HELP messages placed in strategic parts of the game. Read them well as these cryptic clues may prove invaluable.

Most items which are available are included in the location description, however, if you go to the market there's more choice but you have to think hard about what you may need later on. Remember to SAVE your game position in the early stages so that you can go back for anything you may have omitted to collect.

The graphics are clear, colourful and reasonably detailed. Disk access is at the usual slow speed.

If you are moving between locations the format N,W,E,S,W,E,G,E,T,S,H,C can speed up progress. The interpreter understands basic verb/noun formations but an increase a little more detail may be needed. One retrograde aspect is the necessity to enter all words in full with very few single letter entries understood. Two that you can use are I for Inventory and L for look to repeat a location description.

There is no RAM SAVE facility but there are seven named positions saved to disk. You will need these as in several places death will follow the wrong move, for instance if you lose a game of Hangman with a troll!

Although a most enjoyable game with lots to find and plenty of puzzles to solve, there would be several different ways to complete the game so perhaps experienced players will appreciate that challenge. Definitely fun for all kinds of players. P.P.

## NICRIS DOME

**D**ue to limitations of room and resources, the Earth's dead are no longer buried or cremated as used to happen, but are transported into orbit. There, a huge space-station called the Nicras Dome circles around. Run by a group of mandarins, they in turn are controlled by an Arch-mandarin who is rumoured to be trying to create something of a powerhouse for himself.

As weapons have been banned on Earth for a few

concourse, it is really bad news when it is discovered that the Archimandroid has filled the Notre Dame with various potential forces and got smuggled into the dome in the next batch of coffee. Your mission is to seek out and destroy the Archimandroid at all costs.

*Notre Dame* is a somewhat simplistic adventure which starts with you in your coffin. The first (illogically) strike you straight away. Although you can see nothing in the coffin either now or when you open it, if you return to the coffin and close the lid, a pair of rubber gloves has mysteriously materialised. Nothing is guaranteed to put off an adventure player (or at least this reviewer) than such nonsense.



**Notre Dame** You can also use a Room Map now. It's a nice addition.

The atmosphere created by the game is minimal. Location descriptions are bare - you are in the reception lobby/chamber three as opposed to chamber two or four. The graphics likewise have a feeling of similarity to them. Even at a budget price, I cannot recommend *Notre Dame* GURU.

As promised in our LQ pages, we're not just trying to publish a run of the mill adventure column, so for those of you who want something a bit different, read on to check out some other original games.

## TASS TIMES

If your idea of style is a ultra red dimension switch then you'll relish this bizarre graphic adventure from Activision.

The game is set in the ultra tass (readly) world of Tassatown that exists in another dimension. Tass' favorite old bogey, Gramps has built an inter-dimensional machine and has got himself lost in Tassatown and it's up to you to find him. Helped by Gramps' dog Spot who is really El Dorado the Legend in Tassatown you must search this strange land trying not to look too much like a total tourist.

There's nothing weird about the excellent adventure system used to play this game. The screen display is split into areas including a graphic display of your current location, a text display (for use only twice) and alongside them a series of large icons through which you can quickly generate the commands look, move, hit, buy, get, drop, talk to, tell me

about as well as north, south, east, west, up and down. You can also enter standard text commands; use the predefined function keys to repeat commands and quicksave and load previous positions. You can even examine and get objects illustrated in the pictures by simply pointing a cursor at them.

The village of Tassatown is an ugly green brute called Franklin Saar who would love to get his claws on you in between his attempts to buy up the town. His antics to date and other essential clues are packed into the latest edition of the *TassTown Times* that also includes advice that will help you become tass and the most collection of curious small aids.

*Tass Times* is undeniably a unique adventure featuring the most peculiar settings, characters and descriptions but it is also very good and will be Activision's best non-fantasy adventure. Remember TassTown as license visitors but not total tourists. T.P.



## THE STANDING STONES

**T**his is the second Activision title which holds a challenge for the beginner without being too complicated. Set in the ground beneath an ancient stone circle, the idea is to locate the long, lost Holy Grail.

When you begin play you must create a knight. Go carefully here, as it is important. A list of attributes appears with random ratings of up to 18. If you don't like the numbers assigned, you can try again. The instructions suggest that you only accept a character with at least three attributes in double figures. In which case, why do they give so many with less than 10? The attributes are: virility, intellect, boldness, agility, and initial hits. These can be roughly translated as strength, magical attack, peaceful spells (such as 'heal' and 'teleport'), agility is self explanatory and initial hits indicates your ability to withstand attack.

Once you've settled your character, it's time to enter the 3D maze, where you must explore, fight monsters and collect treasures.

The maze must be mapped for you to stand any chance of success. On the first level, a series of arrows points the way to the exit. It is best to use this over and over again so that you build up your experience. Leave it at your peril.

Apart from the monsters there are many useful items, including magical books, chests, potions, rings, weapons and armour. Unfortunately many of these articles are booby-trapped so it's not all plain sailing.

When you encounter a monster you have several courses of action: fight, greet, bribe or run away. Fighting is usually the best option, however, elves and gnomes will sometimes return a favor and give you a gift as well.

Throughout your quest you have a companion named Lancelot. Most of the time he is sleeping or sharpening his sword but occasionally he bursts into action and dispatches your peasant foes.

The deeper you go the harder the game becomes. Further down there are zones which will require drained strength but tiles are not always in the same place.

The graphics consist of simple line drawings for the maze and fairly basic shapes for the entities. You may have the dimensions at any time to trace your character.

Not a bad game if you choose your character carefully before setting the traps. Even then you should not expect to stay alive long unless you map your route and this can be difficult due to secret doors and one way passages. The Fantasy Screen calls for a lot of patience, a will to live and a bit of luck.

Matching pairs can be a strain on the eyes as you scan across at an average of 50 tiles that are in view for most of the game. The others are hidden from view in the piles in the centre of the pattern which you must gradually eliminate.

Math Jenga sets contain 144 tiles split into three major units and crabs, bats and spots (also known as characters, bathtubs and circles) three dragons, four winds and an odd collection of flowers and seashells. As there are four of each piece you would think that matching pieces would be easy but you'd be surprised at the number of times you'll have a choice between three pieces and have to work out which one to leave.

Options at the bottom of the screen allow you to undo moves you want to play again and even peek at hidden tiles that can't be shown in.

THE INFLUENCE OF THE CULTURE ON THE PRACTICE OF MEDICAL ETHICS

#### **BONNY CEEFERS**

**T**he big day has arrived. Your stay, courtesy of Her Majesty, is about to end. It was only supposed to be for two years, but you got time added on for bad behaviour. You have been looking forward to this day for some three years now, not least because you have a small amount of unfinished business to attend to. You were stolidly up something rotten even that Long Eaton Spaghetti eaper and a sort of exorcism would not see to it.

Dodger Cawson is an allusion in two parts. In part one, you must find a crime to commit and assemble a team to help you do it. Part two involves putting off the actual crime. The game is set in the East End of London, presumably because everybody knows that that is where all the real criminals hang out. There is the usual collection of misfits as you make your way round dark alleys, seedy pubs, a disblighted area and the dog track. Crimes are being committed all around you, judging from the number of wanted posters above, but can you actually find the men required for your team? And who is the shadowy figure with the white Coach shoes who turns up everywhere? And why are there animal bones hidden in the warehouses full of iron tubs when they are clearly marked Banco di Palermo? All you have to go on is a telephone number from a colleague who was released on the same day as you will be.

Boddy Clegg is a reasonable enough game without being outstanding. The pace is fairly steady, being for the most part verbulous input. There are a few spot graphics, usually the wanted posters which brighten the place up but the gangster atmosphere and jokes don't quite

卷之三

Philosopher's Stone, Starving Towne Arckwright, old Lucy

*Mr. Clegg's Garden, London WC2E 8HU.  
Neath House Oak Mews, 7 Grosvenor Business Centre,  
Bromley, Kent BR1 3AA. Tel. 081 688 2222.*

**Rowe Rivers, Stampers' Antislavery, 21 Fleet Street, London**

Doddy George Melbourne Mayor, 60 High Street, Hemel Hempstead, Herts, HP1 1AB, England.



— 10 —

**A** variation of the card game pinoes doesn't sound like the usual fodder for a computer game but it's surprisingly addictive.

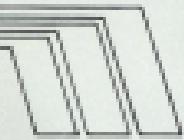
This variation uses the 144 tiles found in a Mah-Jongg set (the ancient Chinese game) arranged in a set pattern that is supposed to represent a dragon. The pattern rises in the middle to a height of five pieces (the head) and down to rows of single tiles.

To complete pairs that are then removed from the game the player can only match tiles that aren't surrounded by others which usually means from the head and tail. By this method you must try and remove all of the tiles or at least as many as possible either on your own, in solitaire play or against other humans in a tournament game against the clock.

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## GAME OF THE MONTH

# Football Fortunes

*Polish up your favorite boots, get your mom to wash your strip and sit down to a game of soccer with Brian Clough.*

*By Tony Hetherington*

**B**rian Clough has always been known as an unusual football manager. Now the game that carries his name is a computer game - with a big difference because it's also a board game!

Inside a packed video game cassette box is the game tape or disk, a folded game board, five colored counters, 112 player cards, continuity cards and a heap of game money and, of course, an extensive instruction booklet. As the game loads the players just have time to set out the board, check and place and sign up as a top manager in a super league of 10 teams. Between now and the teams can be managed by humans the rest are controlled by computer and one of four skill levels. There's no great mystery here, the higher the skill level the stronger the computer teams that you'll face.

In fact the whole game is remarkably simple and after only a few games you'll be wheeling and dealing with the best of them. Indeed the hardest part of the entire game is persuading the game board to stay flat after being folded up inside the box.

Once the game has loaded you have to choose your team from the list available on screen and overweight one if your favourite's not included in the initial line up. After a brief



pause, the computer displays the line up for each team or turn including two keepers. This line up consists of a series of numbers, between one and five that represent the skill levels of your goalkeepers, defenders, midfielders and attackers that form your initial squad of players. You then take the corresponding cards from the pack of playing cards to start the game. These cards also feature names for every player that are said to cause ones particularly if you're fortunate's only a level one and not an international standard level two. The names aren't important to the game but vital to football fanatics so a few blank cards are included to correct these "mistakes".

The game plays as alternate rounds of moving the players around the board and football fixtures are on the computer although the computer is active throughout.

By throwing the computer dice players move their counters around and land on squares that contain the problems and crises that make up a manager's job. These range from the Manager's Luck and Selection Problem Cards that are displayed randomly on the computer screen to the dreaded Wages that are paid out and depend on the size and skill levels of your squad.

The Manager Luck cards are a bit of a lottery and can even cost £5,000 to install astro-turf on your pitch.

 PLAYER 2: <b>Manchester</b>	
 DEFENDER = 1.5	
 MIDFIELD = 1.0	
 ATTACKER = 1.0	
 WAGERS	

illing the reserved' training ground. The same is true of the Selection Problems cards but most are bad news and can cost you a crucial player for a match through injury or suspension but the occasional one may get you a free transfer.

The most exciting square generate player auctions in which the manager bid for the next card in the player pack.



At some stages in the game bidding can get desperate as players outbid each other particularly if a local star player is involved. Occasionally a manager gains the advantage if he bids on a 30% Auction square as he only has to pay half of his final bid!

Before each match the players must enter their total attack and defence strengths that are calculated from their selection card team. A few seconds later having contemplated these and factors such as home advantage and league position the CH4 software displays the results and the gate money that the players receive.

The season consists of only nine matches as each team plays each other but also includes FA Cup matches featuring giant killers such as Yeovil Town, and, from the second season European matches, although your squad has to be good to live with the likes of Bayern Munich and Juventus.

Throughout the game your achievements and results are noted and are converted into game points and at the point determined and (a number of seasons or a time limit) the player with most game points will be "over the moon" as he has won the game.

One final piece of advice is keep off the Crisis Square! This outside space (referred to as "sick as a parrot" square) costs you £50,000 and your best player!

A fascinating mix of computer strategy and board game fun that combine to form the football favourite. **WJ**

#### Teacherline

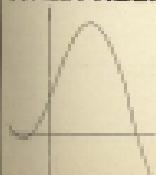
**Title:** Brian Clough's Football Fortune. **Supplier:** CBS Software, 1299 House, Peckover Road, Buntingford, Herts, WD2 4AB. **Marketing Cost:** £49.99 (aged 11-16) (adult). **Difficulty:** 5/10. **Playability:** 10/10. **Graphics:** N/A. **Music:** 7/10.

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# Shepherd's View

*Nigel Shepherd, boss of Commodore US, explained his recipe for Commodore's future success to our globe trotting reporter,*

*By Peter Chandler*

In this business, shows are always worth a look since they provide a general gathering of the big-wigs of our industry. The CES Show in Las Vegas in January was no exception, and that's where I managed to track down Nigel Shepherd, General Manager of Commodore North America, encamped in the splendour of Commodore's stand.

## The Venue

The CES Exhibition is held twice a year in the USA. The summer show is staged in Chicago and the winter extravaganza takes place in Las Vegas. It was the latter venue that I headed my way this year.

The Las Vegas show is the largest of its kind in the world and this year's event was no exception with a record attendance of over 100,000 visitors. The show is open only to trade visitors, made up largely of representatives from distributors, manufacturers and the media, pouring in from the USA and all over the world. Exhibitors consisted mainly of audio, video, satellite, photographic and most importantly from my point of view, computer companies.

There were four venues: the Las Vegas Hilton, the Convention Centre, the Sahara Hotel and the Riviera Hotel. The home computer companies were all based in the West Hall, a huge building which is just one of many which form the Convention Centre.

Commodore was there in force and exhibited its products from a massive and very impressive stand. It was a sobering sight to see Commodore taking such an aggressive approach at

the largest show of its kind in the world. Commodore launched three C64/128 products at the show: the



Nigel Shepherd

1981 3½" disk drive, 128k RAM Expansion card and the 1531 mouse. A number of software companies were exhibiting from the stand including Byte to Byte, Quantum and Asuka Research.

## The Man Himself

Nigel Shepherd, a man of presence, very charming and charismatic, is the General Manager of Commodore US and North America. He reports directly to Tom Rattigan, President and Chief Executive Officer of Commodore USA. The other individual in the sales and marketing hierarchy who also reports direct to the President is Harald Sprey, based in Frankfurt, Germany, and responsible for European operations.

Nigel Shepherd is South by birth and Australian by commerce and has been involved with Commodore since 1977. Initially as an Australian Commodore distributor, Commodore later set up an Australian subsidiary and in 1979 Nigel Shepherd became the General Manager for the Asia Pacific Region (all countries from Australia to Hong Kong). In January 1986, he moved to the US to take over North American responsibilities.

## Tripartite Aims

Nigel Shepherd sees Commodore as active in three sections of the computer industry.

Firstly, he sums up the C64/128 as the "classic definition of the home computer". His authoritative view is that 90% of all C64/128 purchasers are first time buyers, also many 128 buyers are people upgrading from a C64.

He also sees Commodore playing an important role in the large educational market in the US particularly in the primary school sector known in the States as K1 to K12. To back this up Nigel also reminded me that in the USA, Germany and Australia markets Commodore are leaders with the C64/128 in home computers. He sees the C64/128 as a common product line which will be around in 1990 and Commodore will continue to support the machines with peripherals software etc.

The much upgraded Amiga machine, only recently launched, is seen by Nigel as the future of Commodore both in the home and business markets.

Being Frank, Nigel commented that "probably the single largest criticism aimed at the Amiga is that the consumer is unsure whether or not the machine is for the home or is a desk top computer - a computer too highly priced to be accepted as a home computer and the lack of productivity

software and there is still a great demand for productivity software. The buyer who has grown up with a C64 or even a Spectrum, and is looking for a second purchase will appreciate better sound, graphics and top class games - Amiga technology lends itself to this market."



COMMODORE 64

software makes it difficult to accept it as a business machine."

Commodore's answer to this criticism is to launch three different versions of the Amiga and attack both home and business markets in terms of price and quality.

Nigel explained that the first version, the Amiga 2000, has fantastic user loyalty and it will be followed in the main line models by two new Amigas the 3000 and the 2000 to expand the product line.

Nigel explained the thinking behind this strategy. He envisages that the C64/128 will be purchased as a family machine by first time buyers with a main use for children aged five to 12 years old. The machine is not too expensive but Commodore cannot be sure that the family will continue to use it. The answer to upgrading combined with continued brand loyalty is the Amiga 300 - the low cost version, described by the enthusiastic General Manager as "the ultimate home computer". On top of this the high demand for computer learning will

### 2000 Amiga

The 2000 Amiga will be a desk top or business computer and will also be the home overlap machine. Nigel Shepherd believes that "the home is a location". Although traditionally used for learning and entertainment, many small businesses have been domestic locations as cottage industries. The 2000 will lend itself both to the home/office and user business application.

As we go to press, both the 300 and the 2000 are scheduled for launch in the Hanover Fair in Germany at the end of March.

Nigel also sees the Amiga gaining acceptance in tertiary education. He claims that it is ideal for universities as its price combined with its sound and graphics capabilities are not found elsewhere. He quickly pointed out that the Apple Mac has neither the sound or colour of the Amiga and also stressed that neither the Mac or the Amiga have MS DOS Capability.

### Purely for Business

Commodore's third section of interest in the computer market at the moment is inevitably the business end due to the Amiga's PC AT, XT and MS DOS compatibility. Commodore has also launched the PC10 and 20. The PC10 was only recently launched in the US so it's still early days for these machines.

### Waxing Philosophical

Nigel Shepherd explained the Commodore philosophy in the following terms. "Commodore will continue to design and manufacture machines that are competitive and will enable both Commodore and retailers to make money. We will continue to be in the MS DOS market place. There will always be a home market and Commodore's original forte is serving that market. Commodore is moving up market to desk top publishing and corporate type machines. We are committed to today's and to future market places."

He added: "The difference between today and two years ago is that now a machine can be suitable for all of the markets - home, personal and business - all in one box whereas before there were three distinct machines. Commodore has one major advantage - the Amiga chip set."

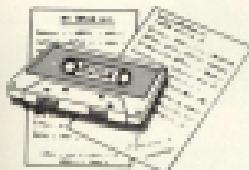
Acknowledging specifically about Commodore's UK outfit, Nigel replied: "Commodore North America has been through tough times in the last 18 months and like Commodore UK, had to rationalise the business and start all over again." However, Nigel believes that the corner has now been turned. He sees Commodore UK consolidating and building in this country. A sense of major promotion was evident in the past but the company has fought for survival and we will now see a much more aggressive approach. Nigel Shepherd is confident that Commodore will return to being a major factor in the UK marketplace.

Our Commodore certainly hopes so and we'd like to thank Nigel Shepherd for taking time to express his view of Commodore North America.

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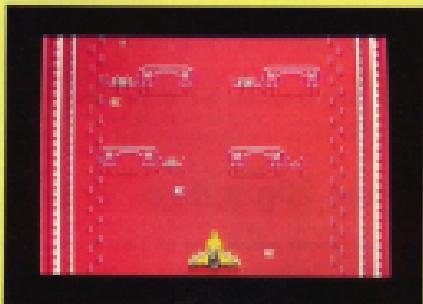
# Sport on Channel 64

*Futuristic sports games are all the rage at the moment.  
Try your hand at these out-of-this-world titles.*

By Tony Hetherington

**S**port in the future (according to the software house) is to be fast, furious and will usually involve a steel ball. There obviously won't be any grass left in the world as not a blade is in sight as an average of 1.8 billion balls or race tracks, robots and gravitrons in pugno built stacks, planets and tracks.

Futuristic sports games are inevitably influenced by science fiction films, notably *Alienball* and *Death Race 2050*, and are often developed from existing sports to bolster flagging television ratings.



## Racing Destruction

Henson's Aliylian leads off the futuristic racers you compete in a bizarre set of challenges known as the Aliylian races. Written by Lindsay author Andrew Brynfoot, the racer must compete in contests such as the Moon Open, Astro Class, Galactic Open and Mad-Max Search. He pilots a custom built convertible racer that can swap from high speed, climbing single racer mode to a slower twin laser craft for maximum destructive power. The races are run over a variety of planet surfaces that range from the fragile



shattered and the lousy Arbors to the indestructible hardwall which will destroy a racer on impact.

The object of the game is to amass points by winning races and prize money so that you can come more races to gain more points. Points are won by completing the race (achievement in itself), by shooting the laser firing robots/guards that are thrown in to litter things up and by



scoring bonus points that depend on the race type. In time trials bonus points are linked to your time, in endurance races it's surviving that matters and in destruction races you must destroy the landscape.

### On the Ball

Graffiti's Trailblazer is, by comparison, a far simpler game in which you must bounce a ball down a track that bounces out of the screen at you at breakneck speed. Against staying on the track is a major task in itself without your opponents efforts to push you off into oblivion. Bouncing from square to square you must plan your route along the narrowest platforms avoiding the traps that slow you down, reverse your controls or send you plummeting out of the contest. Then you're ready to gently push your opponent over the edge to gain those crucial seconds to win the race.

Battleball (Activision) pits two Battolots in competition with each other as they race around a bouldered pitch chasing a steel ball. Their aim is to fire the ball into one of two moving goals.

In a fixed game the bats that are controlled by either human or shield pilot can catch or fire the ball using their primitive forcefields. The outcome is decided on points with a goal being worth more if it is scored from a distance. A fast and furious game that's incredibly addictive to play.

The same could also be said of Odia's Hypersold which features the battle for the Super Cup between two three man teams, the Hawks and the Vixens. Before the match you can choose your players from the 10 man squad to be your experienced senior one and two and thirdhand general. After a quick appearance by the cheerleaders the players take their positions either side of the central pole on which the goal glider travels on its relentless path up and down making goals even harder to get.



Thanks to a force field network the players are trapped in zones in between which the ball bounces and rebounds until captured by a player. However he has only two seconds (otherwise he incurs a penalty) to pass the ball or shoot at goal.

After 30 grueling minutes of play the result is reported in the popular newspaper the India.

### Bouncing Out

Score 10 is an unlikely spin-off from CRL's Tow Grip and is

found in the Gal-cope leisure complex. Described as a mixture of Billiards and Pong the game features a split screen battle two giant bats to knock a ball behind their opponent to score points.

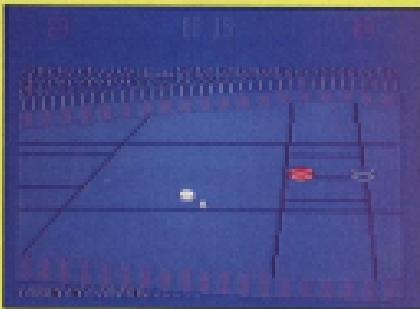
Knocking a ball into a goal is the aim of Argus/Prec Software's Toss and is a futuristic development of share half-penny football. The two contestants must fire their nets out to intercept and knock the ball into the goal to score in front of a capacity crowd.

Finally, the future comes from Beyond games description as two amateur clad knights, called Eric and Ashley fire a steel ball at each other and into holes in the road to score much winning points.

### Tow Grip

**Version:** 2nd edition. **Trading Estate:** Milton, Abingdon, Oxon OX14 4BY. Tel: 0235 822949.

**Activation:** 22 Pond Lane, Manganese, London NW1 2PN. Tel: 01 437 1781.



**Graffiti:** Alpha House, 10 Currier Street, Sheffield S1 4PS. Tel: 0742 525423.

**Odia and Beyond:** One Floor, 14 New Oxford Street, London WC1A 1PS. Tel: 01 580 8878.

**CRL:** 9 Kings Road, Caversham Road, London E13 2BS. Tel: 01 591 2198.

**Argus/Prec Software:** Victoria House, Leicester Place, London WC2H 7BB. Tel: 01 409 0888.



# Basic Memory

*Programming in Basic can be a headache especially if you start running out of space. These routines should ease the situation.*

By Allen Webb

The 64 has a full compliment of 64K of RAM, but the designers, in their infinite wisdom, made only about 38K available to Basic. For those able to use machine code, the ROM basic's the ROMs is easily used but to most others, it's forbidden fruit. There is one lump of 48K between the ROMs, however, which can be used. Basic keeps track of storage of variables in a collection of four page pointers. These pointers, along with their starting values, are listed in Table 1.

### Pointer Variations

The values of these pointers are changed as program lines or variables are added or removed. By setting these pointers to the RAM between the ROMs, we can have a second variable area. Listing 1 gives a short routine which will do this task for you. The routine lives in the cassette buffer so that it doesn't pinch any memory. The routine has three entry points:

**SYS 836:** This sets up the table which saves the pointer values to some default values pointing to the spare RAM. This table is overriden when you want to use the extra RAM and is updated when you return to the normal RAM. This command effectively performs CLR on the extra RAM. Since using this command when the extra RAM is active messes things up, it checks which RAM is in use and

acts accordingly. Calling it when normal RAM is active gives the required result. Using it with the extra RAM active simply results in a floating border at a warning and nothing else. As far as I can see, CLR will act

correctly on the extra variables when they are active.

**SYS 835:** This switches in the extra RAM. The border turns red to warn you about it.

**SYS 836:** This switches back to normal RAM. The border is set the light blue to show it.

Attempting to activate a variable set when that set is current may corrupt the pointer table. Consequently, the routine won't let you take such action.

Once you have the extra RAM switched in, the operating system updates the pointers as required. So that the extra variables are preserved, the pointer values are remembered each time you switch to normal variables.

Listing 2 gives a simple demo to show how the routine works. Line 10 performs CLR on the extra RAM and switches in it. Since FRE uses the variable pointers, you will see that it works correctly on both sets of RAM. The routine shows you that two variables sets of variables with the same names can be used.

One word of warning. You must not perform actions which change the pointers or any software which depend on them when the extra RAM is in use — always switch the normal RAM back in first. Such operations include adding or deleting program lines and using assemblers which use the variable pointers to assist storage.

### Alternative Process

An alternative method of adding to your available memory is the use of random access on disk to provide virtual memory. Some serious

#### PROGRAM LISTING 1

```

1000 1000:0000-0000-0000-0000-0000-0000
1100 1000:0000-0000-0000-0000-0000-0000
1200 2000:0000-0000-0000-0000-0000-0000
1300 2000:0000-0000-0000-0000-0000-0000
1400 2000:0000-0000-0000-0000-0000-0000
1500 2000:0000-0000-0000-0000-0000-0000
1600 2000:0000-0000-0000-0000-0000-0000
1700 2000:0000-0000-0000-0000-0000-0000
1800 2000:0000-0000-0000-0000-0000-0000
1900 2000:0000-0000-0000-0000-0000-0000
2000 2000:0000-0000-0000-0000-0000-0000
2100 2000:0000-0000-0000-0000-0000-0000
2200 2000:0000-0000-0000-0000-0000-0000
2300 2000:0000-0000-0000-0000-0000-0000
2400 2000:0000-0000-0000-0000-0000-0000
2500 2000:0000-0000-0000-0000-0000-0000
2600 2000:0000-0000-0000-0000-0000-0000
2700 2000:0000-0000-0000-0000-0000-0000
2800 2000:0000-0000-0000-0000-0000-0000
2900 2000:0000-0000-0000-0000-0000-0000
3000 2000:0000-0000-0000-0000-0000-0000
3100 2000:0000-0000-0000-0000-0000-0000
3200 2000:0000-0000-0000-0000-0000-0000
3300 2000:0000-0000-0000-0000-0000-0000
3400 2000:0000-0000-0000-0000-0000-0000
3500 2000:0000-0000-0000-0000-0000-0000
3600 2000:0000-0000-0000-0000-0000-0000
3700 2000:0000-0000-0000-0000-0000-0000
3800 2000:0000-0000-0000-0000-0000-0000
3900 2000:0000-0000-0000-0000-0000-0000
4000 2000:0000-0000-0000-0000-0000-0000
4100 2000:0000-0000-0000-0000-0000-0000
4200 2000:0000-0000-0000-0000-0000-0000
4300 2000:0000-0000-0000-0000-0000-0000
4400 2000:0000-0000-0000-0000-0000-0000
4500 2000:0000-0000-0000-0000-0000-0000
4600 2000:0000-0000-0000-0000-0000-0000
4700 2000:0000-0000-0000-0000-0000-0000
4800 2000:0000-0000-0000-0000-0000-0000
4900 2000:0000-0000-0000-0000-0000-0000
5000 2000:0000-0000-0000-0000-0000-0000
5100 2000:0000-0000-0000-0000-0000-0000
5200 2000:0000-0000-0000-0000-0000-0000
5300 2000:0000-0000-0000-0000-0000-0000
5400 2000:0000-0000-0000-0000-0000-0000
5500 2000:0000-0000-0000-0000-0000-0000
5600 2000:0000-0000-0000-0000-0000-0000
5700 2000:0000-0000-0000-0000-0000-0000
5800 2000:0000-0000-0000-0000-0000-0000
5900 2000:0000-0000-0000-0000-0000-0000
6000 2000:0000-0000-0000-0000-0000-0000
6100 2000:0000-0000-0000-0000-0000-0000
6200 2000:0000-0000-0000-0000-0000-0000
6300 2000:0000-0000-0000-0000-0000-0000
6400 2000:0000-0000-0000-0000-0000-0000
6500 2000:0000-0000-0000-0000-0000-0000
6600 2000:0000-0000-0000-0000-0000-0000
6700 2000:0000-0000-0000-0000-0000-0000
6800 2000:0000-0000-0000-0000-0000-0000
6900 2000:0000-0000-0000-0000-0000-0000
7000 2000:0000-0000-0000-0000-0000-0000
7100 2000:0000-0000-0000-0000-0000-0000
7200 2000:0000-0000-0000-0000-0000-0000
7300 2000:0000-0000-0000-0000-0000-0000
7400 2000:0000-0000-0000-0000-0000-0000
7500 2000:0000-0000-0000-0000-0000-0000
7600 2000:0000-0000-0000-0000-0000-0000
7700 2000:0000-0000-0000-0000-0000-0000
7800 2000:0000-0000-0000-0000-0000-0000
7900 2000:0000-0000-0000-0000-0000-0000
8000 2000:0000-0000-0000-0000-0000-0000
8100 2000:0000-0000-0000-0000-0000-0000
8200 2000:0000-0000-0000-0000-0000-0000
8300 2000:0000-0000-0000-0000-0000-0000
8400 2000:0000-0000-0000-0000-0000-0000
8500 2000:0000-0000-0000-0000-0000-0000
8600 2000:0000-0000-0000-0000-0000-0000
8700 2000:0000-0000-0000-0000-0000-0000
8800 2000:0000-0000-0000-0000-0000-0000
8900 2000:0000-0000-0000-0000-0000-0000
9000 2000:0000-0000-0000-0000-0000-0000
9100 2000:0000-0000-0000-0000-0000-0000
9200 2000:0000-0000-0000-0000-0000-0000
9300 2000:0000-0000-0000-0000-0000-0000
9400 2000:0000-0000-0000-0000-0000-0000
9500 2000:0000-0000-0000-0000-0000-0000
9600 2000:0000-0000-0000-0000-0000-0000
9700 2000:0000-0000-0000-0000-0000-0000
9800 2000:0000-0000-0000-0000-0000-0000
9900 2000:0000-0000-0000-0000-0000-0000
A000 2000:0000-0000-0000-0000-0000-0000
A100 2000:0000-0000-0000-0000-0000-0000
A200 2000:0000-0000-0000-0000-0000-0000
A300 2000:0000-0000-0000-0000-0000-0000
A400 2000:0000-0000-0000-0000-0000-0000
A500 2000:0000-0000-0000-0000-0000-0000
A600 2000:0000-0000-0000-0000-0000-0000
A700 2000:0000-0000-0000-0000-0000-0000
A800 2000:0000-0000-0000-0000-0000-0000
A900 2000:0000-0000-0000-0000-0000-0000
AA00 2000:0000-0000-0000-0000-0000-0000
AB00 2000:0000-0000-0000-0000-0000-0000
AC00 2000:0000-0000-0000-0000-0000-0000
AD00 2000:0000-0000-0000-0000-0000-0000
AE00 2000:0000-0000-0000-0000-0000-0000
AF00 2000:0000-0000-0000-0000-0000-0000
B000 2000:0000-0000-0000-0000-0000-0000
B100 2000:0000-0000-0000-0000-0000-0000
B200 2000:0000-0000-0000-0000-0000-0000
B300 2000:0000-0000-0000-0000-0000-0000
B400 2000:0000-0000-0000-0000-0000-0000
B500 2000:0000-0000-0000-0000-0000-0000
B600 2000:0000-0000-0000-0000-0000-0000
B700 2000:0000-0000-0000-0000-0000-0000
B800 2000:0000-0000-0000-0000-0000-0000
B900 2000:0000-0000-0000-0000-0000-0000
BA00 2000:0000-0000-0000-0000-0000-0000
BB00 2000:0000-0000-0000-0000-0000-0000
BC00 2000:0000-0000-0000-0000-0000-0000
BD00 2000:0000-0000-0000-0000-0000-0000
BE00 2000:0000-0000-0000-0000-0000-0000
BF00 2000:0000-0000-0000-0000-0000-0000
C000 2000:0000-0000-0000-0000-0000-0000
C100 2000:0000-0000-0000-0000-0000-0000
C200 2000:0000-0000-0000-0000-0000-0000
C300 2000:0000-0000-0000-0000-0000-0000
C400 2000:0000-0000-0000-0000-0000-0000
C500 2000:0000-0000-0000-0000-0000-0000
C600 2000:0000-0000-0000-0000-0000-0000
C700 2000:0000-0000-0000-0000-0000-0000
C800 2000:0000-0000-0000-0000-0000-0000
C900 2000:0000-0000-0000-0000-0000-0000
CA00 2000:0000-0000-0000-0000-0000-0000
CB00 2000:0000-0000-0000-0000-0000-0000
CC00 2000:0000-0000-0000-0000-0000-0000
CD00 2000:0000-0000-0000-0000-0000-0000
CE00 2000:0000-0000-0000-0000-0000-0000
CF00 2000:0000-0000-0000-0000-0000-0000
D000 2000:0000-0000-0000-0000-0000-0000
D100 2000:0000-0000-0000-0000-0000-0000
D200 2000:0000-0000-0000-0000-0000-0000
D300 2000:0000-0000-0000-0000-0000-0000
D400 2000:0000-0000-0000-0000-0000-0000
D500 2000:0000-0000-0000-0000-0000-0000
D600 2000:0000-0000-0000-0000-0000-0000
D700 2000:0000-0000-0000-0000-0000-0000
D800 2000:0000-0000-0000-0000-0000-0000
D900 2000:0000-0000-0000-0000-0000-0000
DA00 2000:0000-0000-0000-0000-0000-0000
DB00 2000:0000-0000-0000-0000-0000-0000
DC00 2000:0000-0000-0000-0000-0000-0000
DD00 2000:0000-0000-0000-0000-0000-0000
DE00 2000:0000-0000-0000-0000-0000-0000
DF00 2000:0000-0000-0000-0000-0000-0000
E000 2000:0000-0000-0000-0000-0000-0000
E100 2000:0000-0000-0000-0000-0000-0000
E200 2000:0000-0000-0000-0000-0000-0000
E300 2000:0000-0000-0000-0000-0000-0000
E400 2000:0000-0000-0000-0000-0000-0000
E500 2000:0000-0000-0000-0000-0000-0000
E600 2000:0000-0000-0000-0000-0000-0000
E700 2000:0000-0000-0000-0000-0000-0000
E800 2000:0000-0000-0000-0000-0000-0000
E900 2000:0000-0000-0000-0000-0000-0000
EA00 2000:0000-0000-0000-0000-0000-0000
EB00 2000:0000-0000-0000-0000-0000-0000
EC00 2000:0000-0000-0000-0000-0000-0000
ED00 2000:0000-0000-0000-0000-0000-0000
EF00 2000:0000-0000-0000-0000-0000-0000
F000 2000:0000-0000-0000-0000-0000-0000
F100 2000:0000-0000-0000-0000-0000-0000
F200 2000:0000-0000-0000-0000-0000-0000
F300 2000:0000-0000-0000-0000-0000-0000
F400 2000:0000-0000-0000-0000-0000-0000
F500 2000:0000-0000-0000-0000-0000-0000
F600 2000:0000-0000-0000-0000-0000-0000
F700 2000:0000-0000-0000-0000-0000-0000
F800 2000:0000-0000-0000-0000-0000-0000
F900 2000:0000-0000-0000-0000-0000-0000
FA00 2000:0000-0000-0000-0000-0000-0000
FB00 2000:0000-0000-0000-0000-0000-0000
FC00 2000:0000-0000-0000-0000-0000-0000
FD00 2000:0000-0000-0000-0000-0000-0000
FE00 2000:0000-0000-0000-0000-0000-0000
FF00 2000:0000-0000-0000-0000-0000-0000

```

Table 1

Pointer location	Function	Starting value
49,48	Start of variables	2000
49,49	Start of arrays	2000
49,50	End of arrays	2000
50,51	Bottom of strings	40960
50,50	Top of variables	40960

programs use this approach to provide HELP information without replacing the memory available to the main program. The Listing 3 provides a general routine which will write and read blocks of up to 256 bytes on disk. To those of you who aren't in the know, the disk is split into 38 tracks, each comprising of a number of sectors. The number of sectors varies from 17 to 21 depending on the position of the track. Each sector holds 1024 bytes or 256 bytes.

The program uses a menu system to provide five options. The first option reserves the specified sectors and files each with a zero byte (\$00). This is because a zero byte is used as a sentinel to indicate the end of a string. This reservation (or allocation)

operation is nullified if you use the `UNLOAD` instruction, so beware!

Option 2 saves a string at the required location. Since you may want to input a string of up to 252 bytes, a special input routine (lines 750 to 800) is used. All you do is type in the string using cursor keys and `ENTER`, to edit it. The string must end with an asterisk. When the string is complete, press back arrow to process it. The sectors on the disk are numbered sequentially so that track one holds sectors zero to 20, track two holds sectors 21 to 40 etc. Since tracks are of variable length, the routine from lines 1450 to 1470 is needed to calculate the relevant track/sector from the number of the data block.

Option 3 loads and prints a

specified data block. If you want to extract data in your own programs, you should reproduce lines 800 to 860, lines 1450 to 1470. If you're a careful programmer, you should also use the error checking routine (lines 1670 to 1700).

Option 4 prints a map of the disk contents. Allocated but unused sectors are shown as "W". Those containing data blocks are shown as "D". The final option simply allows you to format a disk.

Data saved using this program does not appear on the directory since it is written directly to the disk. If, in fact, you use the track which holds the start of the directory (track 10), and try to load the directory, you will get an interesting result!

#### PROGRAM LISTING 2

```
30 10 PRINT"1)FORMAT(2)CLEAR AND ACTU-
40 RATE PARTITION BARSHEED"
50 20 PRINT"3)PRINT A STRING TO A
60 30 PRINT"4)LOAD AND SET UP TO
70 40 PRINT"5)READ SECTOR(S) FROM DISK"
80 50 PRINT"6)PRINT(7)ENTER STRING(8-1
90 60 PRINT"8)DECODE(9)PRINT(10)PRINT
100 70 PRINT"11)FORMAT(12)CLEAR AND AC-
110 RATE BARSHEED VARIABLE"
120 80 PRINT"9)READ SECTOR(S) FROM DISK(13)
130 90 PRINT"10)PRINT(14)PRINT(15)PRINT
140 100 PRINT"11)FORMAT(12)CLEAR AND AC-
150 RATE BARSHEED VARIABLE"
160 110 PRINT"17)FORMAT(18)PRINT
170 120 PRINT"19)PRINT(20)PRINT(21)PRINT
180 130 PRINT"22)FORMAT(23)PRINT(24)PRINT
190 140 PRINT"25)FORMAT(26)PRINT(27)PRINT
200 150 PRINT"28)FORMAT(29)PRINT(30)PRINT
210 160 PRINT"31)FORMAT(32)PRINT(33)PRINT
220 170 PRINT"34)FORMAT(35)PRINT(36)PRINT
230 180 PRINT"37)FORMAT(38)PRINT(39)PRINT
240 190 PRINT"40)FORMAT(41)PRINT(42)PRINT
250 200 PRINT"43)FORMAT(44)PRINT(45)PRINT
260 210 PRINT"46)FORMAT(47)PRINT(48)PRINT
270 220 PRINT"49)FORMAT(50)PRINT(51)PRINT
280 230 PRINT"52)FORMAT(53)PRINT(54)PRINT
290 240 PRINT"55)FORMAT(56)PRINT(57)PRINT
300 250 PRINT"58)FORMAT(59)PRINT(60)PRINT
310 260 PRINT"61)FORMAT(62)PRINT(63)PRINT
320 270 PRINT"64)FORMAT(65)PRINT(66)PRINT
330 280 PRINT"67)FORMAT(68)PRINT(69)PRINT
340 290 PRINT"70)FORMAT(71)PRINT(72)PRINT
350 300 PRINT"73)FORMAT(74)PRINT(75)PRINT
360 310 PRINT"76)FORMAT(77)PRINT(78)PRINT
370 320 PRINT"79)FORMAT(80)PRINT(81)PRINT
380 330 PRINT"82)FORMAT(83)PRINT(84)PRINT
390 340 PRINT"85)FORMAT(86)PRINT(87)PRINT
400 350 PRINT"88)FORMAT(89)PRINT(90)PRINT
410 360 PRINT"91)FORMAT(92)PRINT(93)PRINT
420 370 PRINT"94)FORMAT(95)PRINT(96)PRINT
430 380 PRINT"97)FORMAT(98)PRINT(99)PRINT
440 390 PRINT"100)FORMAT(101)PRINT(102)PRINT
450 400 PRINT"103)FORMAT(104)PRINT(105)PRINT
460 410 PRINT"106)FORMAT(107)PRINT(108)PRINT
470 420 PRINT"109)FORMAT(110)PRINT(111)PRINT
480 430 PRINT"112)FORMAT(113)PRINT(114)PRINT
490 440 PRINT"115)FORMAT(116)PRINT(117)PRINT
500 450 PRINT"118)FORMAT(119)PRINT(120)PRINT
510 460 PRINT"121)FORMAT(122)PRINT(123)PRINT
520 470 PRINT"124)FORMAT(125)PRINT(126)PRINT
530 480 PRINT"127)FORMAT(128)PRINT(129)PRINT
540 490 PRINT"130)FORMAT(131)PRINT(132)PRINT
550 500 PRINT"133)FORMAT(134)PRINT(135)PRINT
560 510 PRINT"136)FORMAT(137)PRINT(138)PRINT
570 520 PRINT"139)FORMAT(140)PRINT(141)PRINT
580 530 PRINT"142)FORMAT(143)PRINT(144)PRINT
590 540 PRINT"145)FORMAT(146)PRINT(147)PRINT
600 550 PRINT"148)FORMAT(149)PRINT(150)PRINT
610 560 PRINT"151)FORMAT(152)PRINT(153)PRINT
620 570 PRINT"154)FORMAT(155)PRINT(156)PRINT
630 580 PRINT"157)FORMAT(158)PRINT(159)PRINT
640 590 PRINT"160)FORMAT(161)PRINT(162)PRINT
650 600 PRINT"163)FORMAT(164)PRINT(165)PRINT
660 610 PRINT"166)FORMAT(167)PRINT(168)PRINT
670 620 PRINT"169)FORMAT(170)PRINT(171)PRINT
680 630 PRINT"172)FORMAT(173)PRINT(174)PRINT
690 640 PRINT"175)FORMAT(176)PRINT(177)PRINT
700 650 PRINT"178)FORMAT(179)PRINT(180)PRINT
710 660 PRINT"181)FORMAT(182)PRINT(183)PRINT
720 670 PRINT"184)FORMAT(185)PRINT(186)PRINT
730 680 PRINT"187)FORMAT(188)PRINT(189)PRINT
740 690 PRINT"190)FORMAT(191)PRINT(192)PRINT
750 700 PRINT"193)FORMAT(194)PRINT(195)PRINT
760 710 PRINT"196)FORMAT(197)PRINT(198)PRINT
770 720 PRINT"199)FORMAT(200)PRINT(201)PRINT
780 730 PRINT"202)FORMAT(203)PRINT(204)PRINT
790 740 PRINT"205)FORMAT(206)PRINT(207)PRINT
800 750 PRINT"208)FORMAT(209)PRINT(210)PRINT
810 760 PRINT"211)FORMAT(212)PRINT(213)PRINT
820 770 PRINT"214)FORMAT(215)PRINT(216)PRINT
830 780 PRINT"217)FORMAT(218)PRINT(219)PRINT
840 790 PRINT"220)FORMAT(221)PRINT(222)PRINT
850 800 PRINT"223)FORMAT(224)PRINT(225)PRINT
860 810 PRINT"226)FORMAT(227)PRINT(228)PRINT
870 820 PRINT"229)FORMAT(230)PRINT(231)PRINT
880 830 PRINT"232)FORMAT(233)PRINT(234)PRINT
890 840 PRINT"235)FORMAT(236)PRINT(237)PRINT
900 850 PRINT"238)FORMAT(239)PRINT(240)PRINT
910 860 PRINT"241)FORMAT(242)PRINT(243)PRINT
920 870 PRINT"244)FORMAT(245)PRINT(246)PRINT
930 880 PRINT"247)FORMAT(248)PRINT(249)PRINT
940 890 PRINT"250)FORMAT(251)PRINT(252)PRINT
950 900 PRINT"253)FORMAT(254)PRINT(255)PRINT
960 910 PRINT"256)FORMAT(257)PRINT(258)PRINT
970 920 PRINT"259)FORMAT(260)PRINT(261)PRINT
980 930 PRINT"262)FORMAT(263)PRINT(264)PRINT
990 940 PRINT"265)FORMAT(266)PRINT(267)PRINT
1000 950 PRINT"268)FORMAT(269)PRINT(270)PRINT
1010 960 PRINT"271)FORMAT(272)PRINT(273)PRINT
1020 970 PRINT"274)FORMAT(275)PRINT(276)PRINT
1030 980 PRINT"277)FORMAT(278)PRINT(279)PRINT
1040 990 PRINT"280)FORMAT(281)PRINT(282)PRINT
1050 1000 PRINT"283)FORMAT(284)PRINT(285)PRINT
1060 1010 PRINT"286)FORMAT(287)PRINT(288)PRINT
1070 1020 PRINT"289)FORMAT(290)PRINT(291)PRINT
1080 1030 PRINT"292)FORMAT(293)PRINT(294)PRINT
1090 1040 PRINT"295)FORMAT(296)PRINT(297)PRINT
1100 1050 PRINT"298)FORMAT(299)PRINT(300)PRINT
1110 1060 PRINT"301)FORMAT(302)PRINT(303)PRINT
1120 1070 PRINT"304)FORMAT(305)PRINT(306)PRINT
1130 1080 PRINT"307)FORMAT(308)PRINT(309)PRINT
1140 1090 PRINT"310)FORMAT(311)PRINT(312)PRINT
1150 1100 PRINT"313)FORMAT(314)PRINT(315)PRINT
1160 1110 PRINT"316)FORMAT(317)PRINT(318)PRINT
1170 1120 PRINT"319)FORMAT(320)PRINT(321)PRINT
1180 1130 PRINT"322)FORMAT(323)PRINT(324)PRINT
1190 1140 PRINT"325)FORMAT(326)PRINT(327)PRINT
1200 1150 PRINT"328)FORMAT(329)PRINT(330)PRINT
1210 1160 PRINT"331)FORMAT(332)PRINT(333)PRINT
1220 1170 PRINT"334)FORMAT(335)PRINT(336)PRINT
1230 1180 PRINT"337)FORMAT(338)PRINT(339)PRINT
1240 1190 PRINT"340)FORMAT(341)PRINT(342)PRINT
1250 1200 PRINT"343)FORMAT(344)PRINT(345)PRINT
1260 1210 PRINT"346)FORMAT(347)PRINT(348)PRINT
1270 1220 PRINT"349)FORMAT(350)PRINT(351)PRINT
1280 1230 PRINT"352)FORMAT(353)PRINT(354)PRINT
1290 1240 PRINT"355)FORMAT(356)PRINT(357)PRINT
1300 1250 PRINT"358)FORMAT(359)PRINT(360)PRINT
1310 1260 PRINT"361)FORMAT(362)PRINT(363)PRINT
1320 1270 PRINT"364)FORMAT(365)PRINT(366)PRINT
1330 1280 PRINT"367)FORMAT(368)PRINT(369)PRINT
1340 1290 PRINT"370)FORMAT(371)PRINT(372)PRINT
1350 1300 PRINT"373)FORMAT(374)PRINT(375)PRINT
1360 1310 PRINT"376)FORMAT(377)PRINT(378)PRINT
1370 1320 PRINT"379)FORMAT(380)PRINT(381)PRINT
1380 1330 PRINT"382)FORMAT(383)PRINT(384)PRINT
1390 1340 PRINT"385)FORMAT(386)PRINT(387)PRINT
1400 1350 PRINT"388)FORMAT(389)PRINT(390)PRINT
1410 1360 PRINT"391)FORMAT(392)PRINT(393)PRINT
1420 1370 PRINT"394)FORMAT(395)PRINT(396)PRINT
1430 1380 PRINT"397)FORMAT(398)PRINT(399)PRINT
1440 1390 PRINT"399)FORMAT(400)PRINT(401)PRINT
1450 1400 PRINT"402)FORMAT(403)PRINT(404)PRINT
1460 1410 PRINT"405)FORMAT(406)PRINT(407)PRINT
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# Games Reviews

*There are some fast and furious games this month and some more leisurely titles for you to dip into.*

## CLASSIC SNOOKER

**H**ere's a chance for huddling Jimmy Whines to try and complain that grown boys flounce and all from the comfort of their own home. Classic Snooker has enough options to keep even the most devout fan quiet during the odd hour when, due to some unfortunate error in the programming schedules, there isn't actually any of the real stuff on the box.

There are three skill levels and you can choose to play solo against a friend or the computer. Control of the game is simplicity itself. Position the cueball at the 'D' if necessary, select the angle of the shot, decide what, if any, spin you want to impart on the cueball, and finally select the power required. If you get it right, you're prompted for a colour and this is simply a matter of choosing the colour from your choice. Details of the scores, current break and highest break, to date are displayed below the table. There is an edit mode selected so in the program so you don't have to play a full game if you don't want to or you can set up and practise all those fancy bank shots.

The only problem with the game, and unfortunately it's a major one, is that the balls are far too active when hit. You

only have to break into the pack at half speed and you are issued to balls whizzing all over the table in the most amazing flaunting of Newton's Law of Motion. You certainly have more than enough time to chalk your cue between shots.

All this is a pity because it totally ruins the plausibility of what is otherwise a well presented game. A brave effort but one that has sadly misfired.

SLASH

## Touching

**D**ate: Classic Snooker. Machine: C64. Supplier: Joco, 11 West Hill, Dorking, Surrey RH4 2EE. Original price: £19. Graphics: 8/10. Playability: 4/10. Value: 6/10.

## KNUCKLEBUSTERS

**B**y the year 2030, more than one in three of the adult population was in prison after years of riots and civil disobedience. Unsurprisingly, this was witnessed by the simple



expedient of using chemistry or the surgeon's knife to remove any offending part of mind or body. This in turn produced thousands of socially useful androids who were used to patrol the less seedy sections of the city and who had instructions to kill on sight any escaping prisoner. Not as you might imagine by the simple method of blowing their brains out, but rather by hand-to-hand combat which had afforded the prisoner a fighting chance. But who are I to argue as with such far-fetched plots as these, computer games would be so much the poorer?

As it happens, one such prisoner was trying to escape (I bet that surprised you). You play the part of Dale in this latest beat-up from Melbourne House. In order to gain your freedom, you must travel through some areas of the city, firing at avoiding the androids as you see fit. The areas include the cell block, guard area, prison wall, city, alien town and the outer wall. Available actions are move left and right, jump and drop, punch and kick. There are ten different types of android to encounter as well as potentially useful items hidden behind doors and in barrels. All this must be done against the clock as you managed to subdue the prison computer causing the entire city to self destruct. As a hint as to how much time you have got, it may be remembered that Ron Hubbard's sound track lasts for 17 minutes.

And that's all there is to it. The graphics are so-so, the gameplay dreadful. Save your money. G.R.H.

#### Touchline

**Title:** Touchline. **Machine:** C64. **Supplier:** Melbourne House, 60 High Street, Hampton Wick, Kingston upon Thames, Surrey KT1 4DR. **Originality:** 2/10. **Graphics:** 6/10. **Playability:** 5/10. **Value:** 5/10.

#### DANDY

**T**ry this storyline for size. You and two players working as a team must race madly through 12 dungeons, knocking the stuffing out of as many nasty, evil monsters as possible and passing only to pick up treasure, keys and the odd bite to keep your strength up. Sound somewhat familiar? Yes, it's Gauntlet ... minus Dandy, a Gauntlet clone from Electric Dreams.

The two characters are Thor and Sheba, two just very nice characters, all brawn and no brains. They can withstand a considerable amount of damage before death strikes suddenly to the fleshy of flesh. Unfortunately, they have hundreds of enemies intent on cutting you to ribbons, a slice at a time. What is worse, these creatures of dark seem to come in an unending supply thanks to the fact that there are monster generators scattered liberally around each dungeon. If you can destroy every creature on a particular screen, you can also destroy the generator so that they plague you no longer.

Food is only one of the vital goodies for picking up on your travels, restraining as it does your battle weary body. Keys are just as important as they are required to allow you access to other parts of the dungeons. Beware as they can be destroyed by shooting them and if you are not careful in the thick of battle, you may well find yourself cut off! Spells can be found and these have the random effect of killing, disorientating or



paralysing the enemies. Treasure has no real function apart from being something to make your journey worthwhile; in an emergency, you can trade your treasure for energy. The are teleports to be used and completion of a set of challenges gives you a clue to solving a riddle.

All the backgrounds are bright and colourful and there are plenty of creatures crawling round the screen as at given point but the overall effect is to make the screen look very messy. Compare this to Gauntlet where the screen is a lot simpler but look a lot better for it. Not a bad game, by missing that certain spark that makes it a great one. G.R.H.

#### Touchline

**Title:** Dandy. **Machine:** C64. **Supplier:** Electric Dreams, Carlton Crescent, Nottingham NG1 2HW. **Originality:** 6/10. **Graphics:** 6/10. **Playability:** 7/10. **Value:** 5/10.

#### RICOH MAX

**A**t first you have to do is complete the game and save the Astronaut in no less than 23 mission zones on the surface. Find the life and turn on eight backup nuclear reactor systems in the engineering area, shut down the power plant and finally re-arm nine crashlanders in the information complex. This shouldn't be a problem as you're riding the Max!

The Astronaut is one of a group of anti-gravity vehicles used to escape the Sun as it begins an unexpected Super Nova cycle. Safely pass the Sun the mission goes back wrong when members of the Revengous Death Lords land and sabotage the power plants. The alarms sounded so now you must ride Red Max to the rescue.

The game plays like a sequel to Masterton's The Last Of Us as you drive your bike around the planet's surface in the top half of the screen while monitoring controls in the bottom half.

The planet surface is packed with traps to hinder and destroy your efforts. These include lava flows and giant biological slugs as well as the buildings that destroy you if



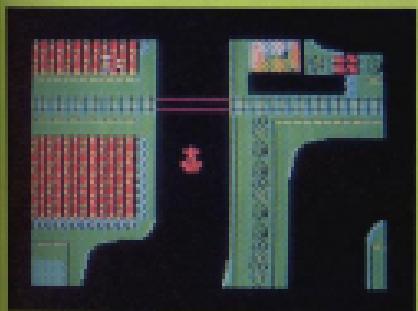
contact. My favourite screens are in the underground areas in which you must drive through lakes and rivers just try to drag you along with the current.

*Red Max* is yet another highly addictive budget game that drives you back for another game, again and again.

T.B.

#### Powerline

**Date:** Feb '88. **Supplier:** Code Masters, 1 Rosemont Business Centre, Rosemont Close, Bury, Lancs. OL5 9RT. **Machine:** C64. **Price:** £17.98. **Originality:** 6/10. **Graphics:** 7/10. **Playability:** 7/10. **Value:** 9/10.



#### STREET MACHINE

YET another racing simulation game. You control a highly powered turbo charged ultimate automobile although you would not think it to look at the screen which depicts an overhead view of you and the other seven cars as you drive round a scrolling track. The car looks like souped down Delays.

Your race is split into three sections - normal conditions, explosive and icy. Control is straightforward. Accelerate, decelerate, left, right and brake. The usual objective is to get

round the course as fast as you can but there is no indication of how well you were doing before you wrote off your vehicle. Even a simple 'You have travelled x miles' on a high score table would help considerably.

Major crashes result in your car exploding and game over time. Minor bumps and general wear and tear can be fixed although it costs you time. A two page menu is presented showing all the various bits of your car and the amount of damage that they have incurred. Anything that is more than 50% damaged must be fixed. This involves moving the cursor to the right and waiting. Damage is repaired with time and you are limited as to how much time you have available. This part of the game is dull in the extreme - it is just a case of looking down the list for high numbers. The menu is no exception.

This game is neither original nor addictive. It would have been reasonable if it had come out in 1983 but now, it looks very dated. In the computer game Grand Prix, *Navy Machine* barely makes it over the starting line. G.R.H. *Finalist*

**Date:** Every Machine. **Supplier:** Software Invasion. **Price:** £1.99. **Originality:** 3/10. **Graphics:** 3/10. **Playability:** 3/10. **Value:** 2/10.



#### BLOOD 'N' GUTS

**D**readful barbarian style is the subject of the latest game from Swedish software house American Action. The game that promises all of the violence and brutality you've ever dreamed about features 10 violent contests in which the loser literally loses his head (thanks to a handy oil-powder gunpowder).

You can select your athlete from the motley collection of Kroc, Hawk, Dog and Dag who does battle against either a human or computer opponent in challenges where the ancient art of jousting wagging is crucial to victory.

The competitors are listed to the full by events that examine their strength, accuracy and constitution in front of a critically violent crowd.

During the contest they compete in a tag of war where the loser ends up in a river, the tower jump where a successful jumper must land on his head and the pole fight our a rousing

when the loser takes a dive!

A barbarian in stocks throws the fire target for the human hit event in which the player must hurl rocks at his nose, arms and legs. In the axe throwing, the barbarians get a chance to throw axes at each other and in the oil throwing a porcupine lances through the air and lands dangerously close to a hungry looking crowd.

My favourite event is the beer drinking in which our heroes must guzzl three barrels of beer without spilling a single drop. A mixture of aiming and wagging are required to drain the barrel and deliver the victory keg before your opponents claimed the froth. Finally, three rounds of arm wrestling end the contest with a sagittal delivering the final blow to the losers.

Each event is supported with "fun" graphics such as a cross section of a barbarian's head so that you can control the flow in the brain drinking and inverted of the players during the arm-wrestle to counteract any loss of balance.

Overall the game is good fun to play despite it's raw appearance and makes a welcome change from the drapes, fields and tracks of the more serious sports simulations.

TJL

#### Touchline

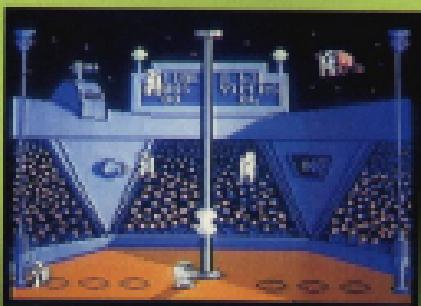
*Title:* Blood'n'Guts. *Supplier:* American Action, Box 10999, 260-41 Malone, London, Machine: C64. *Originality:* 8/10. *Graphics:* 6/10. *Playability:* 9/10. *Value:* 8/10.

#### HYP-A-BALL

**I**t's the day of the Oda Super Cup and a vicious clash between the Hawks and Vipers. You captain the Hawks in the ultimate team game in the Universe - Hypa-Ball.

Before the match can begin you must choose your team from the pool of 10 players knowing that the compensated vipers are just as eager to snap up the stars. You can judge a players abilities from his strength, speed and agility ratings as you scroll along the likes of Alex Grant, Frodo Flange and Sir Globewings.

After a few disastrous games when you've slaughtered in the 10 minute matches, you'll long to see which are the best



players as the computer will pick these ones. However as you get first pick you should make be in with a chance.

The Hypa-Ball stadium is split into two halves by a central pole along which the goal ball relentlessly moves up and down at a constant rate. At either edge of the screen the pitch is bounded by a force field that teleports the seal playing ball onto the other half.

After a quick raid from the cheerleaders the players take their position. The strike ones and ones closer to either side of the pole and are restricted to the half of the field, who ever the groundie can move where he wants as long as he keeps his feet on the ground. The match begins as the ball is freed into play.

Joystick controls move one strike and the groundie at any one time. This takes a while to get used to but soon you're chasing ball. Once you catch it you have to think quickly as you've only got 2.5 seconds to get rid of it otherwise you'll concede a penalty and a certain goal.

Goals are scored by firing the ball at the goal but since it's a moving target this isn't easy. In a 10 minute match against a good computer opponent your concentration must be total as the slightest lapse will let him in to score.

A fast and furious, futuristic sports game supported by super sounds and speedy gameplay. TJL

#### Touchline

*Title:* Hypa-Ball. *Supplier:* Oda, 11 New Oxford Street, London WC1E 1PS. *Machine:* C64. *Originality:* 8/10. *Graphics:* 6/10. *Playability:* 9/10. *Value:* 8/10.

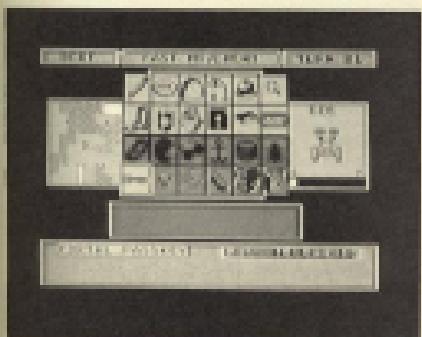
#### ROBOT RASCALS

**R**obot Rascals is the latest game to be released by Electronic Arts (through Arachnid) and is a game that's half computer game and half card game!

Basically, the game is a multi-player treasure hunt with a hand of cards depicting what the players are looking for. Four cards are dealt as the game is loaded in. Then the players select one of the 10 robots that would each be as clever as Electronic Arts' classic game M.U.L.E. Although they are visually different, there doesn't seem to be any difference in their strengths or abilities.

Each turn, each player gets to move his robot around the alien world of Landstrokken seeking out their selected artefacts. Moving through rocks or trees uses more energy than striding through the plains. Either way this energy is deducted from the robots life allocation. When all the energy has gone the turn is over. As well as moving a robot varies for one of the 24 items that range from a demon click to a digital domo. The robot then spins around (he spins the spin the closest you are to the object) and finally points in the direction you need to go in. Collect all five objects and return home (in the centre of Landstrokken) and you've won the game.

Unfortunately, it isn't that simple as the other players are out to stop you. There's another pack of cards, the luck cards, that can force you to show your hand to the others, allow you to swap one of your cards for somebody else's or get everyone to swap with the descriptive "pass the trash



card". All this whirling and dealing is necessary as some cards (and the objects they represent) are better than others such as the Super Shield and Velocity Warmin that add to your robot's powers whereas the Energy Eater and Action Anchor slow you down. There's even a killer card that stops you from whirling unless you can pass it on to someone else. The card gets passed around a lot.

The machine doesn't deal with cards as you can also get your robot to go and grab the other players by ramming them and the stealing what you want but you can also use energy to build shields to protect yourself from smashes.

Finally just as you thought you had things under control comes along one of its global factors such as slowing down all movement or increasing the energy and scuppering your plans.

A fun game for all the family that is best played with the maximum four players to allow maximum walloping. Below me this can get vicious as people have been known to drop objects that I've wasted at the bottom of lakes just to postpone my victory celebrations but don't worry I'll get revenge.

T.H.

#### *Taskforce*

**Ride Robot Racers.** Suppliers: Electronics Arts (Milestone), 18 Long Acre, London WC2E 8AW. Machine: C64 disk. Price: £16.95.

Originally: V/TG. Graphics: V/H. Playability: V/H. Value: V/H.

#### *LIGHT FORCE*

**P**laying a lone Lightforce fighter pilot, here is yet another scenario giving you the chance to put the wrongs of the Universe to right. This time, the object of your mission is to stop an alien force that has invaded a Terra-settled system on the edge of the galaxy. Yes that's another shoot-em-up.

Why is it that whenever there is any sort of trouble, you are the only person around capable of sorting it out? This time, the 'trouble' comes in the form of a few thousand alien

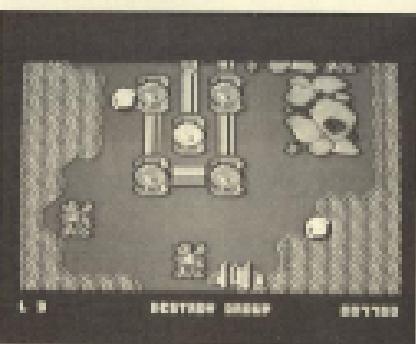
ships and ground defences spread over such divergent landscapes as jungles, asteroid belts and ice-planets.

Despite the ascripted storyline, Lightforce plays very well indeed. The graphics, while not quite as stunning as the Spectrum version, are still noteworthy. The game itself is basically one of learning the patterns of the alienbase aliens while at the same time, manoeuvring yourself into a position whereby you can blast the ground targets. Your task is made more tricky as these need several hits to destroy them. They are vital though. Take out four control centres and you earn yourself a most welcome extra life. Apart from your two lasers, there are other special weapons to be found and activated as you continue your aerial Rambo act.

Faster Than Light, the company producing Lightforce has managed the one ingredient that makes shoot-em-ups stand out from the crowd. The game is incredibly addictive. Couple that with the on screen effects and Lightforce becomes an essential purchase for anyone who enjoys a fast blast.

G.B.H.

**Title:** Lightforce. **Supplier:** Faster Than Light, Geddy Road East, Tipton, West Midlands DY4 7AU. Machine: C64. Price: £9.95. Originally: V/TG. Graphics: V/H. Playability: V/H. Value: V/H.

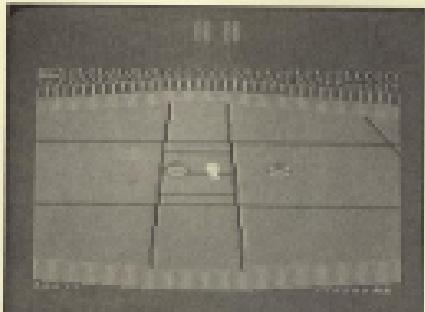


#### *Xeno*

**D**eveloped from a game played by platinum miners, back in the 23rd century, Xeno was originally a game with few rules and considerably violence. The basic idea was a fairly traditional one - try to hit a pack into your opponent's goal more times than he managed to do the same to you. If the pack or you happened to hit the opponent, tough luck!

In today's sanitised version, the game has become a huge spectator sport, the rules have been ironed up somewhat and champions become legends overnight. Xeno is your chance to become one of the sporting heroes of the galaxy.

The game is a sort of space-age ice hockey. Each player controls a disk and takes it in turn to fire it anywhere on the loosey shaped rink, the ultimate objective being to knock the pack into your opponent's goal. You can try and hit the



push direct, knock your opponent's disk out of the way or try to block his shot. The game is played over four quarters and the person with the highest score is the winner.

Playing Xeno is simplicity itself - you simply move a small arrow around the pitch, press fire and your disk travels in the appropriate direction. The games can effectively become user defined as there are a number of variables that you can fiddle with; one or two players, the length of each quarter, the amount of time between shots and a handicapping system for the computer. In practice, the default values work as well as any others and lead to a fast and furious game although not one in which you will be beaten out of sight by the computer.

Xeno is a well implemented, simple game that is great fun to play.

G.R.H.

#### Touchline:

**Title:** None **Supplier:** J&J, Victory House, Levenser Place, London WC1N 3RR. Tel 01 439 0868. **Machine:** C64. **Price:** £19.95. **Originally:** £19. **Graphics:** 8/10. **Playability:** 8/10. **Value:** 8/10.

## THE INVISIBLE

**E**very football manager's dream is to achieve the 'double', by winning both the league and FA Cup in one season. This achievement has only been done five times in the history of English football but here you can try and make it six with this new football simulation game from Scanstar.

Being a football nut myself I can honestly say that this is by far the most realistic game of its kind I have come across. All the usual gameplay features are included with this type of game, but this particular one has many better features than its rivals.

Included among the options are ones that allow you to employ agents to inspect any team or player from any division and a physiotherapist to help cure your injured players. As well as coping with the team problems you are asked to deal with the running of general arrangements, takings, wages and even estimating your attendance. Underestimating the crowd can result in terrace brawls

whilst over estimating can result in huge policing bills and lecture from your chairman.

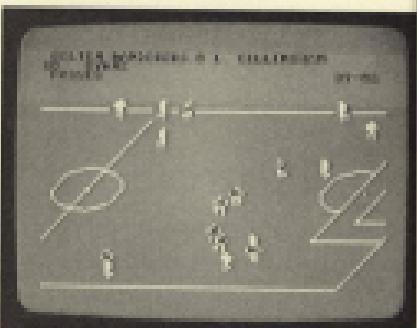
Except for cup matches, watching games is optional and if your side is having a particularly poor spell then you may wish to watch another game from another division. The simulations are rather lengthy and take about 15 minutes a game but commentary of the game helps identify the quality of your players.

After each game you are given the scores, scores and attendance figures for all matches. The attendance figures and playing squads were selected from the 1985-86 season and add a very wry tone to these dimension to the game.

Overall 'The Double' is an exceptionally realistic game and an absolute must for any football fan but it is at times rather slow and time consuming.

S.K.

**Title:** The Double. **Publisher:** J&J. **Machine:** C64. **Supplier:** Scanstar Systems Ltd. Tel 0114 220441/7789. **Originally:** £19.95. **Realism:** 8/10. **Playability:** 8/10. **Value:** 8/10.



## CHAMELEON

**I**n what Electric Dreams describe as a "mortal" arcade adventure, you are Chameleon. Made from Mud and Flux, the fetus of darkness, you must enter the four realms of Fire, Earth, Air and Water and do battle with the demons that now rule them. These demons were created by an evil man to master the powers of nature and so wreak havoc on the Earth with freak storms, blizzards and dust storms.

Using your paws you can snatch the demons and deliver them in combat while repairing the damage caused by the tainted flux.

During your quest you must journey through these strange realms and seek out the tainted flux that can be found only in a certain place and a specific time of day. Luckily, you are fitted with sprung bushes that sound when you meet one of the critters, then it's merely a matter of fighting off the demon onslaught until you can progress to the next realm.

The game features a similar snazzy 3D display as found in *Grenada's Way of the Tiger* as the Chameleon travels past an assortment of energy draining pads and holes and



Background shows pyramids, trees and mountains.

Constant attacks from the demons flares, rashes, eczema, hives, blisters and carbuncles drains your flux energy before which can be replenished by collecting the guardians you are left if you blast the Seven Demons.

Underneath this surreal coat of realms, flux and Limbo lie a surprisingly easy, shallow and ordinary animal adventure. T.H.

French

Mike Cheshire, Supplier: Electric Dreams, 17 Carlton Crescent, Southampton SO1 3EW, Tel: 0703 279684  
Machine: C64.  
Delphine: G/H. Graphics: S/T6. Playability: 7/10. Value: 8/10.

HARTLAND

**T**he strangest things can happen when you read a book that you found in the attic. This one was all about an overnight wizard that saved a magic land from the evil forces of the Wicked Witch. As you near the end of the book you realize that the last six pages are missing! Then to just before you find yourself in the land you were reading about and dressed in the wizard's costume clothes and a sword only with a soft glowing toe-hat.

Your mission is to search the strange platforms and portals of the Heartland for the missing pages so that the very land (Heartland) has a happy ending. However Molan knows of your presence and has sent his minions to get you. These consist of the splitting, whirling and the indestructible jades that chase you even after you've blasted them into a pile of bones.

Your mission is further hampered by the energy draining stats and buildings that float above the platforms and standard pages that detail a different end to the book involving lots of G&H for you and the Headland.

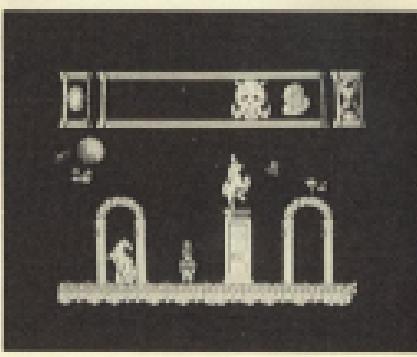
Help is at hand in the most powerful weapons that you can find such as swords and fireballs as well as other items that give you temporary invincibility and a bed that transports you from one scene to another. Despite this the land of Malan isn't far away and gets even closer every time one of

His minions or spells touch you until his face appears at the end of the season ending your game.

**Heimdall** is an excellent arcade adventure featuring some exceptional graphics particularly of the crumbling windows as they disintegrate into a pile of bones. T.H.

Environ Biol Fish

Title: *Revoland*. Supplier: Oahn, First Floor, 24 New Oxford Street, London WC1A 1PS. Machine: C64. Originality: 5/10. Complexity: 5/10. Playability: 7/10. Value: 4/10.



SKY BLISTER

**B**y the 21st Century man was spread throughout the galaxy and at last the governments had found a drug to control him.

This was the result of years of research and countless failures as previous drugs had left guinea pigs in a brainless state. Then on a single plant called *Nicotiana* they actually found it growing on trees. Seventy per cent of the plants cross-bred fruit containing the drug.<sup>26</sup>

Although extremely liberal policing methods didn't work, control drugs were still illegal. You are part of the Ravers Squad that was formed to subdue the Sky running on the streets of Earth.

As you're paid by results you set off to trash as many bikers as possible. The game begins as your skimmer lands on the planet.

Your first problem is to take out the laser towers that protect the Sky collecting bikinis. With your single skimmer you must out gun the towers by blasting them in high speed attack runs. Only then can you land and drop your first of three bikinis.

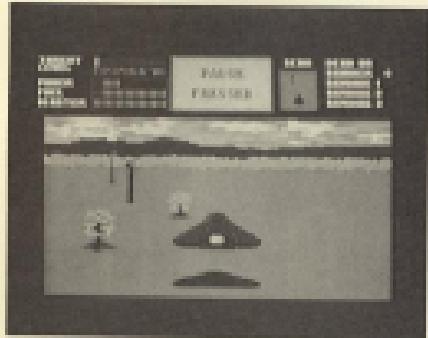
Charging through the trees (that are as deadly as the traps if you crash into them) you must track down and

destroy the Sky Bikes but you must take care not to destroy your fellow racer squad men.

Unfortunately, even the eight different threat or skill levels do nothing to save a game that is bland and reminiscent of a four year old Spectrum game! T.H.H.

### Touchline

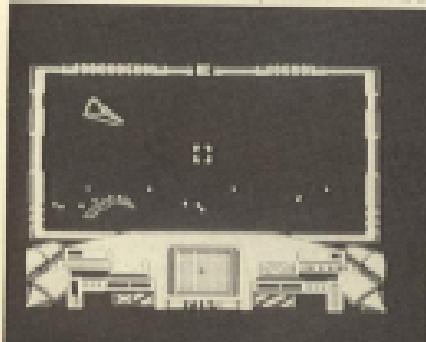
**Date:** Sky Racer. **Supplier:** Cascade Games, Marquette, MI 49654. **Machine:** C64. **Originality:** 4/10. **Graphics:** 5/10. **Playability:** 5/10. **Value:** 5/10



### STARGLIDER

**S**targliders, the game that features vector graphics animation, comes in a box with a 64 page novel, poster and key guide and won every possible accolade in its previous versions, is at last available on the C64.

The Star Glider in question isn't the craft that you fly by pressing at the on-screen controls but giant birds that lead to the downfall of the planet Neosys. These birds migrated through space to Neosys and were fired by the planets Sontari "tag anything" defense system until an attack of



conservation reprogrammed the Sontaris. Unfortunately they also let in the Star Glider shaped Ergon attack fleet that devastated the defenceless planet. Luckily, you were on a nearby moon and have found an ancient alien/borg ground attack vehicle (AGAV) and have gone to the rescue.

There's no great strategic aim to be fulfilled as your job is simply to destroy all you can before they finally get you. Yes, find you can use the planet's refuel, repair and repair facilities that should improve your chances.

Using a combination of keyboard and joystick control you must fly your AGAV and do battle with a collection of alien craft that include the Star Wars inspired walkers and stormtroopers, tanks, tanks, missile launchers and the flapping Star Gliders. Most take more than one shot to kill and some such as the stormtroopers can only be destroyed by firing a missile that you must guide to the target through a separate display.

An excellent game that has been ruined by poor programming. T.H.H.

### Touchline

**Date:** Touchline. **Supplier:** Rainbird, 1st Floor, 24 New Oxford Street, London WC1A 1PS. **Machine:** C64. **Price:** £14.95. **Originality:** 8/10. **Graphics:** 8/10. **Playability:** 8/10. **Value:** 8/10

### 10th FRAME

**T**en pin bowling is the name of the game in this latest sports simulation from the Access/US Gold stable. 10th Frame allows up to eight players to have a go at knocking over as many skittles as possible on either a league or one off basis.

For the uninitiated, ten pin bowling involves rolling a large ball down an alley as you attempt to knock over 10 skittles. You get two attempts to do this. If you succeed in knocking them all down with only one ball, this is known as a strike. Take two balls and it becomes a spare. The secret of a high score is to make sure of getting your spares.

In order to launch a ball, you must first select an aiming point and position your man on the lane. Keeping the fire button pressed will start a bar moving up a scale as you determine the speed of your release. Two small markers determine the scale upper and lower limits for an accurate throw. The bar then slides quickly down the right hand side of the scale and you must press again to stop on one of the three markers - straight, slight hook, and maximum hook. Like your press and your ball is likely to make an early visit into the nearest gutter.

Graphically, the game is a little disappointing. The effects of the skittles falling down is well done but the lane is small - one fifth the width of the screen. The worse part is the sliding scale. Yellow on orange proved very hard to see, especially under artificial light.

10th Frame is a highly accurate simulation of 10 pin bowling but lacks a little in addition sparkle. G.K.M. **Supplier:** **Date:** 10th Frame. **Supplier:** US Gold, Derry 203, Stafford Way, Bofford, Birmingham B6 7AE. **Machine:** C64. **Price:** £14.95. **Originality:** 8/10. **Graphics:** 8/10. **Playability:** 8/10. **Value:** 8/10

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# Cribbage

*If you've ever played cribbage then you'll know just what an addictive game it is and if you haven't then try our Plus/4 version of the game*

*By Hugh McGhee*

**C**rib is one of the most popular pub card games in this country, but have you ever considered trying to beat your computer instead of bursting against the champ down at your local? Now's your chance, if you've got a Plus/4.

## Instructions

It is assumed that the player knows how to play cribbage. The rules are exactly those given in *Wiley's Rules of Games*. Since some aspects of scoring points vary from region to region, the points scored in this version will be re-enforced in this introduction. The following points should thus be noted:

- 1) Due to the layout of the cards X is used to represent a 10.
- 2) Input is handled by means of a joystick in part two. When asked to play or discard a card, simply move the marker which appears above the cards to the required position and press the [select] button. When entering your points, moving the joystick < right > and < left > increases and decreases the points counter respectively. Once again pressing the [select] button ends your response. The program is protected against attempts to cancel or play the same card twice. Attempts to claim too many points produce an error message. The Plus/4 always claims the correct number of points for itself but, if you don't claim all your points, the Plus/4 will steal them.

3) Each player is dealt six cards and must discard two cards into the crib. The Plus/4 plays a simple strategy choosing its best four cards after consideration of the two cards it is discarding. The cards are shuffled after every hand but only cards are shuffled out of the pack to save time. The program differentiates between dealer and non-dealer. The player who doesn't have the crib always receives the first card.

- 4) The Plus/4 runs the cards for the initial crib. The lowest card wins. Note that in this game the ace always counts as one. Illegal combinations are not allowed so two aces (spades, for example) will not be displayed. This, however, such as both players entering a row of different stats, are permitted, in which case they will be performed again.
- 5) The first player to obtain 121 points or more wins.
- 6) Note that in the run up the Plus/4 will check your cards if you say you can't go. This is the only time the Plus/4 examines your cards but it does not cheat. Any discovery of an ability to play after entering 'can't go' will produce an error message, as will attempting to play a card that would result in a total excess of 31. The Plus/4 does not play a strategy in the run up except that it will always make the total 31 if it can. It will not, however, always make the total 13 even if it can.

7) The ending of a go in the run up has proved the most tricky operation in practice. If the player plays last the Plus/4 does not know that the player cannot go unless the total is 31 or the last card has been played. Otherwise the player must either 'can't go' before entering the last point.

Points are scored as follows:

- A) Two points for any pairs, six points for three cards of a kind and 12 points for four cards of a kind.
- B) Two points for any combination of cards totalling 15, counting picture cards as 10.
- C) For any run of three or more cards, count one point for each card in the run.
- D) For obtaining a total of 15 or 31 in the run up, score two points.
- E) For playing the last card in a go in the run up, score one point.
- F) For a flush of four cards in your hand, score four points. Note there are no points for a flush in hand in the crib.
- G) For a flush of five, either in your hand or in the crib, score five points.
- H) If the starter card is a jack, and it is your crib, add two points when counting your hand in the main game.
- I) If you have a jack either in your hand or in the crib of the same suit as the starter card, count one point.
- J) The game is played on the high resolution screen to facilitate the different background colours.

## Variables

The array CASH has four rows and

14 columns. Columns one to 13 hold  
hold the combinations of the cards  
from ace through to king. The 14th  
element of each row holds the suit for  
that row. The suits are, in order,  
spades, hearts, clubs and diamonds.

The 13 cards shuffled out of the pack for each hand are placed in the 2D[1] array. This has two rows of 13 columns, row zero holding the denominations of the cards and row one their respective suits.

The array `CShirt` has four rows and six columns. This holds the initial 24 cards dealt to each player. The FaceValue denominations and suits are in rows zero and one respectively, the denominations and suits of the player's cards are in rows two and three respectively.

The army P16m, this used after the discord has taken place. It has six rows of five columns and is the major card array used in the game. The first four elements in rows zero, two and four hold the denominations of the four cards in the Plus/4's hand, player's hand and the city respectively. The associated suits are stored in the third four elements of rows one, three and five. At the commencement of the game, the fifth element of each relevant row will be occupied by the denomination and suit of the starting card, which is used by all hand.

The face values for the deck cards are stored in the array `PlayCard` for later building the poker card library.

The major order variables are as follows:

<b>P1—</b>	Plus/4's points
<b>P2—</b>	Player's points
<b>TP—</b>	Used in run up to indicate number of cards played in the current game.
<b>T—</b>	Used to total the points in the points scored regime. Also used in the run up to hold the total values in the current game.
<b>PO—</b>	Used in the run up to hold the total points count being the sum of T above and the result of checks for flushes, jacks etc. Also used to hold points scored in the run up as T is otherwise engaged.
<b>ML—</b>	Flag used to indicate who played the current card in the run up. If ML=1 one then the Plus/4 played last, and if ML=2 equals two the player did.
<b>IC—</b>	Flag used in the run up to indicate whether or not the Plus/4 can play a card. The Plus/4 is able to play a card whilst IC is equal to one and unable to go if equal to zero.
<b>YC—</b>	Serves the same purpose as IC for the player.
<b>MCL YC—</b>	These two variables hold the number of cards played in the run up by the Plus/4 and the player respectively.
<b>WC—</b>	Signature who holds the crib. If set to one then the Plus/4 has the crib and if set to two the player has the crib.

the  $\alpha\alpha$ ) to 13 (for the King), whereas now one holds the values one to 10 (for the process of equation (5a)).

The respective values of the shuffled cards are placed in the arrays  $S[0:n-1]$  after shuffling. The values are transferred to  $C[0:n-1]$  after dealing the cards and are finally stored in the  $V[0:n-1]$  array after the deal. The arrays  $S[0:n-1]$  and  $V[0:n-1]$  have exactly the same format as the  $S[0:n-1]$  and  $P[0:n-1]$  arrays described above.

The array  $\mathbf{B}[\mathbf{S}(\mu,\nu)]$  is used by the sorting routine for tree checks. The

inserted cards are placed in row and and after transfer by the sorting routine into new area. That row is sorted into ascending order.

The arrays `M[0][0]` and `V[0][0]` are row vectors each containing 16 real elements. These arrays are used in the run up, and, a non-zero element indicates a player end. As mentioned in this program, any variable prefaced by the letter `M` indicates a value read by the `Flame4`, whereas variables associated with the player are prefixed with a `V`.

www.mca.gov.in







# Diskit 4

*To continue our special series for disk users, we bring you a routine which will foil those would-be hackers from stealing your thunder.*

By Lee Allen

**H**ow often have you written a modularity of program routine, given it to a "friend" only to discover at a later time that somebody else has "polished" and taken the credit? Annoying isn't it?

Also there are a certain number of users that take delight in corrupting software by changing the text routines.

This program routine provides the user with the facility to assemble code thus making the would-be hacker's job that much more difficult as the assembled code disassembles itself.

Chapter 10

Make sure that sufficient room exists on the disk prior to "booting" up PROGSC RAMBLER; occasionally one extra disk block is used on the saved file. Press any key on the keyboard to enter the assembler code, enter the filename of the program to be assembled and press RETURN to start the routine.

The program is then loaded, assembled and saved back to disk as "FILENAME" where filename is the name of the program.

The routine adds 70 bytes to the saved code so the only limitation on this routine is that the original program must exist between \$00001 and \$C7FF. Even if 202 blocks are used there still may be sufficient room on

the disk. As I am sure you are aware, each block is allocated 150 bytes but not may not be used.

Once the save process is completed, the program exists in memory as the finished product and can be re-called at any time by entering B1N.

The program will be used in

earily as listed and sorted prior to running. Error trap codes are included to ensure that the data in read in correctly. The program, when run, stores the relevant code at a temporary address of \$800 and when prompted relocates the working programme Base (\$8000) and starts the menu routine.

www.ijerpi.org | 10





# C16 Games

*Specially for our C16/Plus/4 readers, we bring you a selection of the latest entertainment software for your computer.*

*By Paul Eres*

## DIAMOND MINE

**D**iamond Mine is one of those games that is difficult to get to grips with at the start, but for some reason you have to keep trying 'just one more go'.

The idea is to guide your pipe through the maze to reach the diamonds. You have to avoid contact with the walls and bugs, otherwise you lose that much pipe and you have to start all over again. On each level, the length of pipe you have to start with gets less and less; this is shown at the top left of the screen.

Movement of the pipe is one of those infuriating types of control. Once you start to move, you cannot stop. Therefore you not only have to be accurate, you must also have quick reflexes.

Although this looks a very simple game, there is quite a lot of hidden settings involved in actual play. Pick the shortest route to a diamond, not the easiest, for example.

Although the graphics are simple, most of the screens comprised of well, I quite liked them. Overall, a difficult game to master but well worth the effort.

## Tower Game

**D**iamond Mine. Company: Blue Ribbon Software Ltd, C25 House, Berkley Road, Dagenham, Essex, UK. Price: £19.95. Originality: 3/10. Playability: 7/10. Graphics: 5/10. Value: 5/10.

## MAGICIANS CURSE

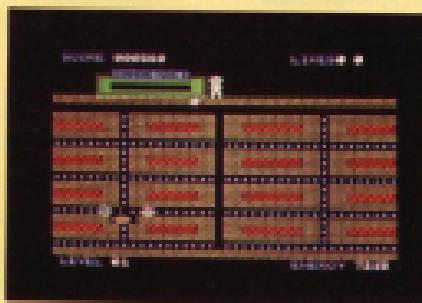
**G**emini Graphics has produced one of the better games for the C16/Plus/4 for some time, with Magicians Curse.

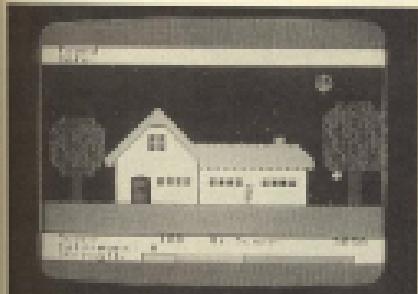
"Long ago, this land was inhabited by an evil magician. This land is now uninhabited etc.", so the story informs you. It's surprising how many evil magicians used to exist.

The prime object is to search this land of 48 screens and locate for yourself a golden statue. Before you achieve this goal however, you may also collect seven talismans. These can be found in various places just lying around.

While you are busy raising four screens to screen, your energy is quite understandably getting less and less. To counteract this, you need to either drink some potions, or eat some food. A couple of the locations will need a key to gain entry, while the underground caverns will need some light source to navigate.

Naturally, it is not quite this simple. There are the odd vampire bats lurking around, and falling apples to dodge. Be





careful which patches you eat, one of them is poisoned (and die quickly).

Considering the limitations in programming the C64, this is quite a good game. I especially liked the animation of the bats, no flakies to be seen anywhere. Also the stars twinkling in the night sky is pleasing. Well done Greenlin.

#### Touchline

**Site:** *Microline Cards*. **Company:** Gemini Graphics, Alpha House 10 Castle Street, Sheffield, S1 4PS. **Price:** £6.99. **Originality:** 6/10. **Playability:** 8/10. **Graphics:** 7/10. **Value:** 6/10.

#### DIAMOND MINE II

**H**aving completed Diamond Mine, you have now moved all your new found wealth into opening up even bigger mines. Diamond Mine II is virtually the same as its predecessor except that there are a couple of variations.

In this version you have an assistant that keeps your mine motor going. This time you can stack the barrels up into your pipe, however after a time they will disengage, so watch out.

If you try to cross over your path, or go back the same way, a life is lost. You can however retrace your pipe by pressing the return key. This feature of the game makes it a lot better to play than the original. You now have the ability to plan your tactics a lot better. After the 10th level the stakes become 'reversible', making your tasks that much harder.

#### Touchline

**Site:** *Diamond Mine II*. **Company:** Blue Ribbon Software Ltd. **CDS House, Broken Road, Doncaster, South Yorks.** **Price:** £7.99. **Originality:** 5/10. **Playability:** 8/10. **Graphics:** 7/10. **Value:** 7/10.

#### PINPOINT

**F**or those of you that have seen Marble Madness, Pinpoint will hold no mystery. The concept is the same. You have to reach the white flag with your spinning top. Having achieved this, you go on to the next level.

Asco has here produced a game that should be very popular. I say should be, but I have my reservations. The main problem, is that the game is just too difficult to play and enjoy fully. Control of the tops is via the joystick, and you need to be very precise in your movements.

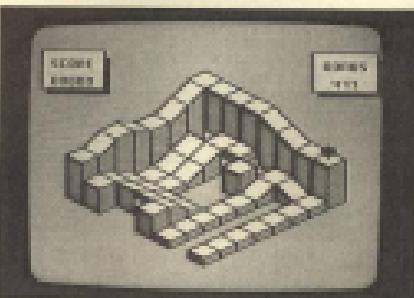
There are the usual steep slopes to climb, and chasms to leap. The downward slopes need to be tackled very slowly otherwise you lose your top off the edge. Understandably, sound is somewhat lacking, and I fear you will soon tire of the 'dit, dit' everytime you lose a top.

The only card informs you that there are 10 levels of difficulty, but I must confess to only reaching the fourth one before abandoning the play. The graphics are fairly poor, bring the two colour variety.

Lovers of Marble Madness and Spindizzy will obviously love this one, as for the rest of you, I have doubts.

#### Touchline

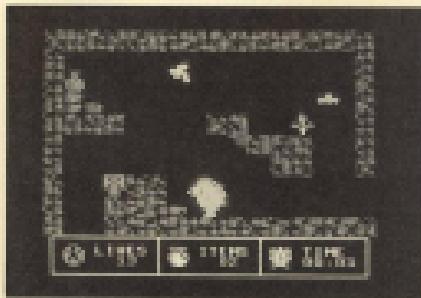
**Title:** *Pinpoint*. **Supplier:** Asco Software, 4 Wincanton House, Special Street, Dartford, Kent. **Price:** £5.99. **Originality:** 5/10. **Playability:** 4/10. **Graphics:** 5/10. **Value:** 6/10.



#### SPIKY HAROLD

**F**urbird has come up with some real winners in the past, but I don't think that Spiky Harold will be one of them. It's a very enough game, but I think it lacks that inexplainable quality of 'funniness'.

The idea is that you have to help Harold collect as much grub as possible, to help him hibernate for the winter. The grub in question consists mainly of apples, grapes, pineapples, (What no custard?) and wine. (Beware not too much).



You have to visit various caverns to collect the said grubs, each is filled with masses of varying types. All the masses have one thing in common, that is, they kill you on contact. This isn't too big a problem seeing as you start off with 19 lives.

The animation of the masses is done very well. My only gripe is the "Character Delete" routine. It takes some time before you can really judge safe distances.

In your wanderings you will, from time to time, come across a coin. Picking this up will give you one extra life. Just one point, the wolf-breed has predicted a severe frost in the next 24 hours. This would obviously tell our Harold, so you must succeed in your task before the time runs out.

Spiky Harold, is basically a platform game, which we either love or hate. Overall not a bad attempt.

#### Touchline

**Title:** Spiky Harold. **Company:** Radical. **28 New Oxford Street, London WC1A 1PS.** Price: £1.99. **Originality:** 4/10. **Playability:** 5/10. **Graphics:** 6/10. **Value:** 7/10.

#### DANGERZONE

**T**here is no escaping the fact that some people enjoy the idea of blasting anything that moves. It may be an in-built desire that humans suffer from. Dangerous lets you do just that.

As test pilot for the XE/98 Fighter cone reconnaissance ship, you have to blast your way through 20 levels of alienoid bolts. The higher the level, the faster they come at you. There are also the odd wave of alien craft to beat as well, so you need to keep your mind on your flying or else.

The scrolling is definitely smooth, and on the higher levels fast as well. My only reservation, is that you can only move in one of two directions (up or down).

Your ship is equipped with rapid fire lasers. However constant use of this facility soon depletes your weaponry, so use this with caution.

Flying without firing will increase your fire-power but

watch out. The action is fast and furious, but I feel that a couple of hours play is more than enough of this one.

#### Touchline

**Title:** Dangerous. **Company:** Calamariex. **1 Economic Business Centre, Brampton Close, Bury St Edmunds, Suffolk, IP21 3BT.** **Originality:** 3/10. **Playability:** 5/10. **Graphics:** 6/10. **Value:** 7/10.

#### ASTRO PLUMBER

**Y**ou can be forgiven for thinking that you have seen this game before. The truth is, you have. I know this one better as Super Pipeline and Super Pipeline II by Taito on the 8-bit.

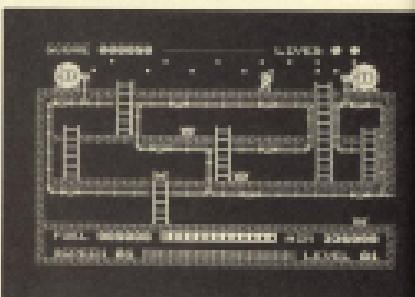
I am not parting this claim though. It's a very good clone. You are the maintenance man just arrived from Earth. Your job is to repair the leaking air pipes that serve Colony II on the moon. (The underground caverns are inhabited by the usual nasties that have to be avoided). To aid you in this task you are wearing a jet pack, which I couldn't quite master.

You use your Plasma laser to repair the pipes. But remember one drains your supply, so use with caution. You can have a screen without completing all repairs, but when you return to that screen, the leaks have reappeared.

You can use the air tanks on the surface of the moon to replenish your supply, but unfortunately you cannot use the jet pack whilst on the surface. When the pressure indicator for the level you are on shows full, you will be awarded a bonus score, and you then progress to the next round. ☺

#### Touchline

**Title:** Astro Plumber. **Company:** Blue Ribbon Software Ltd. **CDS House, Becken Road, Gostwyck, South Yorks.** Price: £1.99. **Originality:** 3/10. **Playability:** 5/10. **Graphics:** 5/10. **Value:** 7/10.



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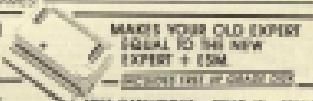
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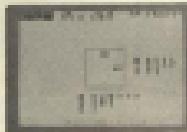
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This program provides the user with the facility to "read" sections of machine memory to the just that! In fact the Basic loader for the program was produced from the very same section.

Start and end addresses are entered to control the range of memory to be converted. These are POKED into the machine code routine resident at \$C000 which re-locates the Basic loader and performs the operation of 'reading' each byte to provide two-digit hex numbers in the data statement e.g.

DATA 0090-0098-40-40-4D-80  
= DATA 0090-0040-40-4D-80

This process is repeated for every type within the range as previously specified. The completed data listing is then saved to disk as DATA and should be reloaded prior to returning to establish start of variables which begins at the end of the BASIC loader.

The 575 address contained in the base loader is the warm start address and should be modified to that required by the nature of the area of memory being accessed.

The program must be typed in exactly as listed and saved prior to running. Error trap routines are included to ensure that the data as read is correct. The program, when run, stores the relevant code at a temporary address of 8000 and then prompted to relocate the working program to base (8000) and return to the program to click.

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# Split Sprite

*Many programmers find that sprite manipulation can be hard work. Perhaps this program will make things a little easier.*

By S.J. Chance

**W**hile developing a machine code program recently, after the initial paperwork, I thought it might be constructive to do a "rough sketch" of it in Basic. Slow is might be, but it's a good way to flesh out a few errors in logic and structure, which might otherwise only be discovered after hours wasted producing redundant code.

I immediately ran into a problem. I intended to use more than eight hardware sprites in the program, and of course it is quite impossible to write a raster-interrupt routine in Basic. For the sake of thoroughness, I shall explain the nature of raster interrupts for the uninitiated.

The image on your monitor screen is drawn by an electron beam moving across the screen in a series of horizontal lines, each line starting just below the previous one. This pattern of lines is called a raster.

Now as we all know, the VIC chip is able to support eight hardware sprites. However, if you put your sprites at the top of the screen, and then use a raster interrupt to find out when the raster has travelled far enough down the screen to have drawn these sprites, you

can then reposition them further down the screen so that when the raster gets to their new location, it draws them all over again. And when you reposition the sprites you can also change their colour and definition.

I decided to write a routine which would make raster-interrupt sprites available from Basic. This was quite easy to do, but created a new problem. I had settled on a screen format of five zones, (see Fig. 1) which meant that my routine was being called 256 times per second. With all that going on, Basic was running at about 1/4 of its normal speed. With potentially 40 sprites to manipulate in addition to whatever else it was doing, it became clear that Basic would need helping out.

I extended Basic with a set of extra commands to set sprite parameters and move them around. Although this slowed down the interpreter even more, the new commands were more efficient and therefore resulted in a net increase in speed. These commands are listed in Figure 2, and I will say more about them later.

Returning to Figure 1, you will see that it shows the screen divided into zones 0 to 4, and link spaces 0 to 3. The

zones are the areas in which the top edge of an unexpanded sprite can be positioned such that the sprite is clear of the raster-interrupt divisions above and below it.

If a sprite is positioned in free space, part of it will lie across the raster-interrupt line and will be drawn with the sprite parameters. For the adjacent zone, to prevent the sprite from looking as if it has been taken half, it must be "linked" to the equivalent sprite in the next zone, so that sprite now share the same parameters. If that all seems a bit of a headache, it will become clearer later.

## Understanding the Commands

Looking again at Figure 2, all the commands are prefixed by the `P` symbol. This is not intended as a source of inspiration, but rather to divert handling of the commands away from the normal interpreter. You will see that many of the commands use the syntax:

`[zone][sprite]`

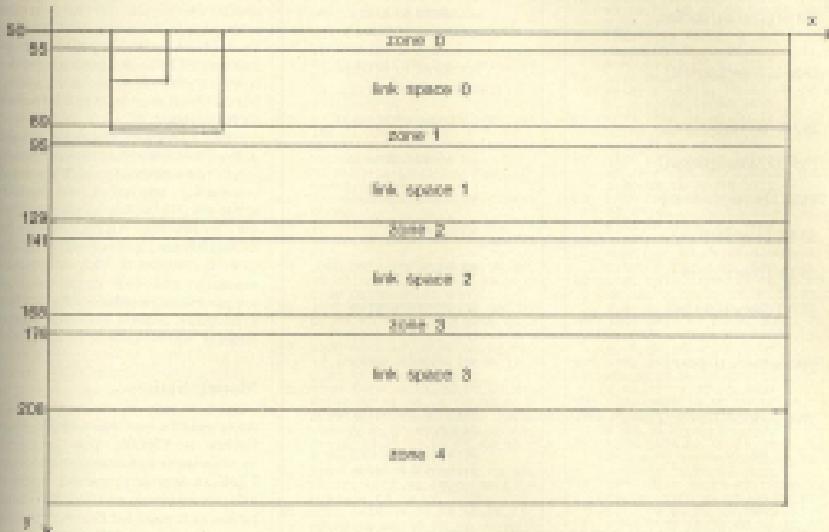


Fig 1

where `zone=0` to 4 and `sprite=0` to 7. From now on I shall refer to a specific sprite by these parameters e.g. sprite 3 is sprite number 6 in zone 3.

Having said that, the Basic command supports a far easier way of specifying a sprite. Consider the command `CYPO` in Figure 2. When positioning a sprite with this command, it is important that the y-co-ordinate falls within the specified zone. This is easy enough to do using Figure 1, but there is an alternative system. This is to assign an integer array element to the sprite, replacing `[zone]`, `[sprite]` in the syntax. For instance, suppose I give the command

`CYPO 2,6,120`

positioning sprite 6 in zone 2 at  $y=120$ . This is correct as  $y=120$  falls within zone 2. However, if I give the command

`CYPO C$00,120`

the sprite will be positioned exactly as

before, and the correct zone number will be written into `C$00`, i.e. `C$00` will now equal 2.

`CYPO C$00,120`

will move the sprite into link space 2, so it will automatically be 'linked' to sprite 6, i.e. its parameters will be

copied into sprite 2. `C$00` will still equal 2.

`CYPO C$00,120`

moves sprite `C$00` into zone 2. Sprite 2 is set automatically by disabled, and the value of `C$00` will change to 2.

Using this system, it is quite

Figure 2

<code>EVIS [zone][sprite]</code>	enable sprite 0.e., make sprite VISIBLE.
<code>DISP [zone][sprite]</code>	disable sprite.
<code>SXPO [zone][sprite][x] co-ordinate</code>	set X Position.
<code>SYPO [zone][sprite][y] co-ordinate</code>	set Y Position.
<code>SPRM [zone][sprite][definition no.]</code>	set pointer to sprite definition (i.e. PIA#Mc)

<b>SMOV [x,y][sprite]</b>	set sprite to hi-res mode (i.e. MultiCol).
<b>SMUL [x,y][sprite]</b>	set sprite to MUL(2)-colour mode.
<b>STBL [x,y][sprite]</b>	set sprite CDLast.
<b>SMCO [x,y][colour]</b>	set MultiColour 0.
<b>SMCI [x,y][colour]</b>	set MultiColour 1.
<b>STSX [x,y][sprite]</b>	STretch X.
<b>STSY [x,y][sprite]</b>	STretch Y.
<b>SPRT [x,y][sprite]</b>	set priority: sprite on FRONT.
<b>SPAK [x,y][sprite]</b>	set priority: sprite at BACK.
<b>SACT [x,y][sprite][integer array element]</b>	returns 1 if ARRAY% (SPRITE) if sprite is on (i.e. ACTive); returns 0 if sprite is off.
<b>SHIT [x,y][sprite][integer array element]</b>	returns 0 in A(RAY%) (SPRITE) if no collision; 1 if sprite to sprite; 2 if sprite to dest; 3 if both.
<b>SMOV [sprite integer array][x offset], [y offset][number of moves][x integer array], [y integer array]</b>	MOVes sprite through (x,y) for set number of moves, storing the new co-ordinates in XARRAY% (SPRITE), YARRAY% (SPRITE).
<b>SP [pxz]</b>	sets the Pace of BASIC relative to the movement of sprites, from 0 to 200. 0: BASIC slow/sprites fast (200) BASIC fast/sprites slow.
<b>SR</b>	stops all sprites being MOVE'd, and clean LPRK table, (i.e. Resets).
<b>SQ</b>	Quite sprite sprite.
<b>SYS 0H12</b>	cold start.
<b>SYS 0H15</b>	warm start.

pairwise to more sprites vertically/MUM about the screen, as long as the relevant sprite in the next row above is available. A sprite expanded in the vertical axis (i.e. STSY) will always need to be MULed. C6PO takes this into account though but the sprite must be expanded before which C6PO is called.

This alternative syntax can be used with all the commands with the [x,y][sprite] parameters, in which case the first command will affect the 'linked' sprites also. However, please note that the INTEGER ARRAY must be declared before it is referred to by one of these commands. This often occurs naturally when an initial value is assigned to an element in the array, but even if not, an "unreferenced" sprite message will be given.

### Moving Sprites

A command which takes this idea even further is SMOV. This command moves a sprite by hooking it on to what I call an "offset" routine, which is like an interrupt routine, but more polite, as it waits for Basic to finish its present command before taking over a sort of multitasking.

SMOV C0H7,(A,B,C,D,E,F,G,H)

will move sprite C0H7 from (x,y) to (x2,y2) 10 times, each time storing the new co-ordinates in C0H7(CYB7). The frequency of these moves against the speed of Basic is controlled by the SP [pxz] command where pxz can have any value between zero and 200. Again, the relevant arrays must be declared before the command is used. Up to 20 sprites may be SMOVED at any one time.

Other commands which pass values to an array are SACT and SHIT.

### The Demo

Lined with the SPLIT SPRITE LOADER is a demonstration program using many of the new commands. It's probably most constructive to RUN this whilst following the listing, which have tried to make as clear as possible. The program waits between the main sections so you can work out what's going on.

Before loading the demo program, make sure you have run the one line

vertically along at the same time as the y-axis need to be aligned, and before

When every  
concern and  
all his actions  
which is  
not more  
British has  
nothing to do.

179

100

**PRINT**  
magazine  
and it is  
in BUX  
which I  
readly,  
and that is  
what is  
squares.  
the line

**DEMO SET-UP** program, which moves the bottom of Basic up to \$400 to make room for the sprite definitions.

When running the demonstration program, please note the last section which uses the **SHIT** command to detect collisions. As the sprites move back and forth, every so often they demonstrate a collision in the system, when a perfectly good collision is not required. This is because it takes a finite time to transfer all the data to and from the VIC registers at each interrupt, and as a result it sometimes happens that VIC is looking in the wrong direction when the collision occurs. In fact there are some dead spots in mid "line space" where no collisions are registered at all. If this proves critical, it often helps to use a different sprite number, or adjust the collision's location at a different point. Alternatively, a more reliable option is to check for collision by comparing the array of data it's containing the sprite addresses.

When writing a program using **SPLIT SPRITE**, it is important to remember that changing a few of **Basic**, or re-**RUNNING**, the program changes all the variables. If there is still a quote locked onto the **MOW** routine, when you next enter any **Basic** command, the **MOW** routine will be called and will be unable to locate the relevant arrays. This will give an error message, which does not really matter, but the way to avoid it is to **EXECUTE C: RELEASED**.

**SPLIT SPRITE** itself is presented here as a ROM Loader. When POKE'd into memory, the program resides at \$0000 - \$1C00F. Use will obviously move later if, once loaded, you save this block of memory for future use, with a machine code monitor.

The program uses the rest of the 8C-shoot along with \$0000 - \$021D\$ to store variables, and is initialised by \$000000\$.

A final thought: if you do write a manuscript with SPARLE SPRITE and intend to tape it to tape, make sure you read the program first to avoid taping problems, as I would have to be responsible for the kind of grief I experienced when, while writing SPARLE SPRITE and preparing to make a back-up copy of my work on tape, I accidentally re-formatted the tape disk I had it on. Aaah!

ANSWER



ANSWER

47 LD R0, #0000000000000000  
48 MO R0, R0, LSL#32, LSR#32, LD, R0, R0,  
49 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
50 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
51 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
52 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
53 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
54 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
55 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
56 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
57 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
58 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
59 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
60 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
61 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
62 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
63 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
64 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
65 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
66 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
67 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
68 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
69 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
70 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
71 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
72 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
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77 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
78 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
79 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
80 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
81 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
82 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
83 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
84 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
85 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
86 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
87 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
88 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
89 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
90 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
91 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
92 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
93 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
94 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
95 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
96 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
97 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
98 R0, R0, LSL#32, LSR#32, LD, R0, R0,  
99 R0, R0, LSL#32, LSR#32, LD, R0, R0

ANSWER





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# Arcade Action

*Plans, tips and programs to help in writing your own arcade games*

By Tony Crowther

**P**roducing your first arcade game need not be the difficult chore that many people believe it to be. All that is required is a good strong idea as to the basis of the game and an understanding of how all of the different parts are going to work.

In order to produce a quality game then it should of course be written in machine code. It is a lot harder to write a program in machine code than Basic; however, the increased speed of execution is essential to a good program.

It is outside the scope of this series to actually teach you about machine code. Should you be interested in learning then you could take a look at a series 'Welcome to the Machine' that started in the March 'Wings of Your Commodore' and finished in December, '88.

I am aware that many people will not be ready to tackle the rigours of machine code just yet. Don't let this put you off. Many good programs are written as a mixture of Basic and machine code.

During this series I will be presenting a series of small programs that you can use yourselves, either as part of a larger machine code program or simply called from within your own Basic programs.

The series will be concentrating on programming with the C64, if you are a C16 or Plus/4 owner don't worry, whenever possible I will provide programs that will work on these machines.

## What's to Come

So what will we be looking at? For a start I will be discussing the use of User Defined characters within your programs, how to use them and move them. Sprites will be dealt with in detail complete with routines to animate them and move them around your screen. Many games use backgrounds that are larger than the screen. The screen acts as a window over the larger playing area. I will be explaining how this is done and again provide routines to do this in your own programs.

A number of miscellaneous routines will also be provided for your use. These will include routines to scroll messages on the screen, print and increment scores, character editors, music programs and many more.

## Presentation

Most of the programs that are presented in this series will be in machine code. I will be giving both the source code for the programs and a Basic loader for those of you who don't want to tackle the assembler.

The assembly language programs have been produced using the Commodore Macro Assembler. I have tried to keep the assembly language as simple as possible so should you use a different assembler you should be able to enter the programs with very few changes.

## Starting Out

In this month's article I am afraid that I am going to make you jump straight in at the deep end and deal with something that is extremely important

```
10 REM * C16 IRQ DEMO ROUTINE *
20 FOR A=818 TO 842:READ C:E=R+C
: FORE A,C: NEXT
25 IF E> 2577 THEN PRINT "ERROR
IN DATA":STOP
30 DATA 120,169,63,141,30,3,169,
3,141,21,3,88,96
40 DATA 162,0,142,25,255,202,208
250,76,14,206,0
50 PRINT "[DOWN][DOWN] SYS 818 TO
START"
```

```

5 REM * C64 INTERRUPT DEMO ROUTINE
60
10 BL-1 :LR=50 :SA=49152
20 FOR L=0 TO BL:CX=0:FOR D=0 TO
15:READ A1CK:CX=A1:POKE SA+L*16-
D,A:NEST D
30 READ A:IF A>CX THEN PRINT "ERR"
40 IN LINE":LR=(LR10):STOP
45 NEXT L
50 DATA 130,169,13,161,20,3,169,
192,161,31,3,88,96,163,0,123,148
55
60 DATA 32,208,202,208,250,76,49
,234,3,0,0,0,0,0,0,1264
70 PRINT "[CLEAR][DOWN][DOWN]]DOWN"
80 SITES 49152 TO START FOR C64

```

FIGURE 1

• **ANSWER** — **Incorrect.**

In the coming months I will be going back to simpler subjects, however many examples that I will be giving will require a knowledge of interrupts and use the IRQ program that I am going to give this month.

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So, just what is this thing that is so important to game writing? Well it's really as simple as its name suggests: it is an interruption of whatever the computer is doing. Let me illustrate what I mean with a simple everyday example.

Let's suppose that you are having a conversation with someone and the telephone rings and interrupts your conversation. You leave the conversation and go and answer the telephone. If the call is for you then you would now hold a continuation with the person on the other end of the telephone. When you had finished you would put the telephone down and get back to and continue your original conversation.

What has happened is that the ringing of the telephone simply interrupted and placed your original conversation for a short while and you carried on where you left off upon resuming.

See "What about interruptions in programming?"

Let's take a look at a practical example. If you were to write a program that required you to move a

Believe it or not your computer is actually being interrupted every 1/30th of a second by the computer's hardware. Everyone can interrupt unless the computer takes a look at a memory location which holds information about where the interrupt program is stored. These couple of memory locations are referred to as the interrupt vector. In normal use whenever an interrupt occurs the interrupt vector holds the address of the general routines which have altered the general running of the computer. These routines are items such as reading the keyboard to see if a key has been pressed etc.

The interrupt vector is stored at the following memory locations:

30 and 31

These locations are the same as all the Commodore machines we are using.

How do you use this in your own program?

100 PAGES

Let's take a look at a practical example. Figure 1 gives a basic loader for a machine code program that uses interrupts. Note there are two versions of the program one for the C64 and one for the Plus4 and C16.

FIGURE 3

```

1000 REM C64 IRQ DATA BASE LOAD
R
2000 FORD=0TO91:CE=0:FORD=0TO15:R
EADA:CX=CX=A:POKE49152:L=16=D,A1
MIXTD
3010 READA:IPAY>CETHIESPRINT"ERRD
R IS LIBE":2040-(L*10):STOP
2030 NEXTL:END
2040 DATA120,162,0,149,0,157,63,
2,232,224,192,144,248,162,0,169,
2045
2050 DATA0,170,157,0,157,157,0,1
58,157,0,159,233,208,244,169,81,
2049
2060 DATA157,88,192,169,192,157,
89,192,232,232,232,224,30,144,23
9,169,1738
2070 DATA0,141,14,230,169,82,141,
20,3,169,192,141,21,3,169,0,148
j
2080 DATA141,18,208,169,27,141,1
7,208,169,1,141,25,208,141,36,20
8,1848
2090 DATA88,96,169,1,141,25,208,
32,0,0,32,0,0,32,0,0,324
2100 DATA32,0,0,32,0,0,32,0,0,32
,0,0,32,0,0,32,192
2110 DATA0,0,32,0,0,76,49,234,12
0,169,49,141,20,1,169,234,1296
2120 DATA141,21,3,169,1,141,14,3
20,169,121,141,25,208,169,240,14
1,1924
2130 DATA26,208,88,96,255,255,25
3,255,255,255,255,255,255,255,25
5,255,3478

```

FIGURE 3

When you run this program it simply POKEs a short machine code routine into memory. To start this machine code routine simply type the SWS instruction which is printed at the program.

What this program does is to change the border colour every time an interrupt occurs. Because interrupts occur extremely quickly the flash rate is so high that the different colours appear as a rainbow of flashing bands.

You may notice that the border is still flashing even though the computer has returned to the READY prompt. You can let any program that is in

memory or even type in a new program and the border will continue to flash. This is because, as I stated earlier, the computer is always being interrupted every 1/30th of a second and our little screen flash routine is run every time an interrupt occurs.

### The Machine Code

So let's have a look at our machine code program and have a look at what it does. Figure 2 gives the source code for the C64 version of the border flash routine. The C16 version is almost identical apart from the locations that

are used to change the border colour.

The program is actually in two separate parts. The first section actually alters the IRQ vector so that it holds the location of our border flash routine, section two of our line demonstration.

Taking the program line by line this is what it does:

1. We turn off the interrupts with the SIE instruction. The reason for turning them off is quite simple. We are going to change the vector that is jumped to when an interrupt occurs. Since interrupts occur every 1/30th of a second, if we didn't switch off the interrupt then it is possible that an interrupt would occur before we had changed both memory locations. If this was the case then the computer would not jump to our routine but rather to some other location in memory and the computer would probably crash.

2. After turning off the interrupts we alter the IRQ vector so that it points to our border flash routine.

3. Now we turn the interrupts back on.

Of course the interrupt vector isn't changed until you execute the program with a SWS instruction.

Our border flash program is extremely simple, all it does is to load the X register with the number 0. This is then stored in the border colour location. The X register now has 1 subtracted from it. Note in machine code if you subtract a 1 from a memory location that contains a 0 it will become 255. The program then loops around until the counter goes back to zero when it jumps to the normal interrupt routine - keyboard scanning etc.

By normal interrupt routines what I mean is that we jump to the routine that is normally executed when an interrupt occurs. In other words we jump to the routine whose address is stored in the IRQ vector when the computer is switched on.

### Going further

I hope that the above demonstrates and supporting text makes it a little clearer as to what an interrupt is. The interrupts we have been dealing with are hardware interrupts that are generated every 1/30th of a second

There are other ways of generating interrupts, for example the raster interrupt which can cause an interrupt depending on the position of the raster on the TV screen. However, at this time we don't really need to go into the other types of interrupt as we will deal with them as required.

100 Examples

As I have already stated we will be using integrals quite frequently within this series. In order to make them easier to use with our numerous values you will find in Figure 2 the

Basic loader for a C64 machine code routine which I call **BBQ DATABASE**. Figure 4 has the source for this. For those of you who want to follow it through, read on from 10000.

This program functions by setting up a 'data base' of switches which are used to turn each switch on and off.

Each routine will be allocated a position in the database and can be turned on and off by simply POKing a 1 or 0 into the relevant location of the database. For example on the C64 should you enter:

四百三

then the Message Scroll routine will be enabled. Of course the Message Scroll routine needs to be present in memory and this will be printed in a later part of the program.

Page 10

Have you ever wondered how you get moving objects in programs? If any of you have seen either of my Blogger games then the moving conveyor belts and ladders are the type of things I mean. Well next month I will provide a routine that will allow you to get them done with ease in your own programs.

11000 4

```

FIGURE 4
1000 ;INTERRUPT ROUTINE
1010 ;INTERRUPT BOOT
1020 ;FROM TO USE FROM MAC
1030 ;JMP 49152 IRQ ON
1040 ;JMP 49272 IRQ OFF
1050 ;FROM TO USE FROM BASIC
1060 ;BTS 49152 IRQ ON
1070 ;BTS 49272 IRQ OFF
1080 ;CINH - 788 ;INTERCEPT VECTOR
1090 ;CINH#T = 39953 :64 IRQ ROUTINE
1100 ;BTBRAE = 801 :START OF DATA BASE
1110 ;REGDRA = 33246 :RASTER POSITION
1120 ;RASDR = 33253
1130 ;TIMEA = 38334 :TIME 'A'
1140 ;INTFLG = 33273
1150 ;IOPRIM = 33274 :INTERCEPT MASK
1160 # = 49152
1170 ;SET UP ROUTINES
1180 ;BTS
1190 ;LDA FO :CLEAR DATA BASE
1200 ;LDA FO :BY PUTTING B INTO
1210 ;LOOP1 1931-1923
1220 ;STA BTBRAE,X
1230 ;TBR
1240 ;CPE #193
1250 ;BCE LOOPS
1260 ;LDA FO :CHANGE NEXT
1270 ;LDA FO
1280 ;LOOPS
1290 ;STA A0193,X
1300 ;STA A0194,X
1310 ;STA A0195,X
1320 ;TBR
1330 ;BCE LOOPS
1340 ;LOOP2 :PROGRAM TO
1350 ;LDA #FFFF :CLR FEDD
1360 ;STA C0000+1,E
1370 ;LDA #FFFF
1380 ;STA C0000+1,E
1390 ;TBR
1400 ;BCE
1410 ;LDA #FFFF :POINT IRQ VECTOR
1420 ;STA C000 :TO PROG
1430 ;LDA #FFFF
1440 ;STA C000+1
1450 ;LDA #00
1460 ;STA RERAG
1470 ;LDA #27 :CLEAR BIT 8
1480 ;STA RERCON
1490 ;LDA #01 :TURS ON RASTER
1500 ;STA TQPAGE :CONTROL
1510 ;CLI
1520 ;FEDD
1530 ;BTS
1540 ;L
1550 ;PROG
1560 ;LDA #1
1570 ;STA INTFLG
1580 ;CHANGEL
1590 ;JSR D :THESE ARE TO BE
1600 ;JSR B :RE-VECTORED
1610 ;JSR D :OVER THE DATABASE
1620 ;JSR D :IS IN USE
1630 ;JSR D
1640 ;JSR D
1650 ;JSR D
1660 ;JSR D
1670 ;JSR D
1680 ;JSR D
1690 ;JSR D
1700 ;JSR D
1710 ;JSR D
1720 ;JSR D
1730 ;JSR D
1740 ;JSR D
1750 ;JSR D
1760 ;JSR D
1770 ;JSR D
1780 ;JSR D
1790 ;JSR D
1800 ;JSR D
1810 ;JSR D
1820 ;JSR D
1830 ;JSR D
1840 ;JSR D
1850 ;JSR D
1860 ;JSR D
1870 ;JSR D
1880 ;JSR D
1890 ;JSR D
1900 ;JSR D
1910 ;PROG :BACK TO NORMAL
1920 ;SCI :TURN OFF INTERRUPT
1930 ;LDA #CIRCUIT
1940 ;STA CIRCUIT
1950 ;LDA CIRCUIT+1
1960 ;STA CIRCUIT+1
1970 ;LDA #1
1980 ;STA TIMEA
1990 ;LDA #FFFF
2000 ;STA INTFLG
2010 ;LDA #FFFF
2020 ;STA TQPAGE
2030 ;CLI
2040 ;RTS
2050 ;END

```





# Printmaster

*Create your own headed paper, greetings cards or other forms of stationery with this program from Ariolasoft.*

*By Evelyn Mills*

**P**rintmaster by Ariolasoft is a very extensive program with an overwhelming selection of options which, in my opinion, gives it a very high rating in the operative field of creating your own graphics stationery. Performance is smooth, impeccable and the program is dedicated to the user in every respect.

On loading, the main menu presents the following options: Greeting Card, Signs, Stationery, Calendar, Banner, Graphic Editor and setup. The latter is for printer setup options; while Printmaster (PM) is preset for the Commodore 128/300, the printer output will allow conversion for Epson, Star, Okidata, Oki and C-Pan printers.

## Editor

So what do we choose first from the main menu? I would suggest Graphics Editor to familiarise yourself with the graphics on the disk and also to experiment with creating your own graphics. Having highlighted this option, choose 'graphics by piccard'... Here you will find 120 plus default graphics for your inspection and use! Some of these graphics are relatively standard, a large proportion are very novel, but each and every one is very well designed for maximum graphic effect.

On display with your graphics, there is a side menu which allows you to edit, clear, invert, flip horizontally, flip vertically, save to disk or print each graphic occupies three blocks on screen; inversion and flipping are shown very rapidly on screen. Editing

and creating both have four functions controlled by F1 which handles drawing, shading, toggling and erasing. Drawing gives solid lines, shading gives dotted lines while toggling draws and erases where lines cross; the shading and toggling combination gives excellent 3D effects. All functions are joystick controlled. F1 will set the mode of operation for you.

## Cards

**Greeting Card:** Here there are seven borders from which to choose, including a few unconventional ones such as 'Yearning art' - the programme really enjoyed making this software. Eight fonts are available and there is space for seven lines of text (58 columns width) so there is no need to stick to the usual conventional, graphic greeting. Both upper case and lower case may be used. Naturally a graphics selection is available in either small, medium or large mode.

Now the program really gets interesting - you can stagger your graphics in a set manner or place them where you wish. At this point the function keys 1, 2, 3 and 7 interplay with one another. F1 positions writing to left, centre or right; F2 alters size; F3 alters style while F7 alters the font. Effectively then, you may interchange positions and change fonts within any one graphic; should you overflow with enthusiasm, the screen will say so and it can be sorted-out with the delete key. While you are still creating a Greetings Card, there is a Front Page and an Inside Page for you to use.

## What have you done?

Now keep moving along (plenty of screen prompts) and you will be given the chance to PREVIEW what you have done. This, I think, is an excellent option. If you don't like what you have designed, back-step with the key and change it all. For a really radical change go back to the Main Menu and start all over again. If you like it - save the whole thing to disk for use at a later date (change a few names around when you reload if you wish) or print it out directly. Now who could ask for more than that?

The 1 function is operative all through the program and allows you to back-step at any point for editing.

## Making Signs

The SIGN Facility operates in a similar manner, and gives you a one page presentation with all the facilities described above including seven lines of entry.

Stationery naturally creates your own paper heading. Here the graphics may be to the left, to the right, 'Up' or a row of tiles. Both the top and bottom of the page are programmable now - the RESTORE Key stops printer output - so don't go too far away or you will have multiple pages at your feet. On the other hand, try half a page if you want!

## What's the date?

The CALENDAR: very good in this again chose your graphics, and font,

plus months and year. The 12 calendar months are listed and are selected by highlighting the year is listed as 1986 which can be changed as desired; you are now asked for a monthly or weekly calendar.

The Monthly calendar selection gives the month, calendar, after heading, and enhance date.

With 'after heading' the font may be changed with FT while the typical heading at the top may be altered with the delete key and input from the keyboard. Anyway assuming that you are quite happy with what you see, select 'enhance date'. From this option you can now enter three lines of free characters, such for any one date to remind you of who's who and what's what. Again you get a preview of your monthly calendar picture.

Yes, if you choose any particular year, the calendar will start on the current day and date of that year. Leap Years - of course they are catered for.

If you choose the weekly option you will then be asked for generic or specific options. The GENERIC format is not dated and the output is full screen with Sunday to Saturday of any one week (of any one month), all any one year's running downwards with blanked, fixed squares running horizontally for you to write on at a later date (in pen, pencil or what not). The SPECIFIC format is similar but dated. Again you may have a preview before printout. The Calendar also supports graphics.

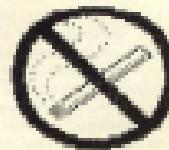
#### Long Notices:

On to the BANNER which gives you graphics, fonts and one line of writing up to 19 characters long. This also used FT for font changing thus allowing you to 'mix it up'.

All through the program upper and lower case may be used as can REVERSE MODE for both graphics and print. Prints can be single, solid or 3D. The 3D effect can be a blinding sort but what obscures my eye may well please yours.

Now if you cannot create with this program don't blame the back room boys. They have given you a disk full of powerful commands to implement plus excellent on screen instructions. The end result is very pleasing to the

# DeVille Scribe Office Hampton Times Western Utopia Computer



eye. The ability to back step, change fonts and words and position your material before printing is an inspiration - plus the fact that not only can you save graphics alone, you can save the whole card, calendar, banner or whatever. A fine star epic.

TJ

#### Technical

Name: Printshop Price: £19.95 Machine  
Card Supplier: Ashtonsoft, 88 Longmead,  
Cover Garden, London WC2R 9AY Tel:  
071 586 3351

# Percussion Section

*Building add-ons for your computer sounds like a daunting task, however Maplin's Computation makes it possible for amateurs.*

By Nell Day

**M**y friend who knows about such things said I was crazy to try, but I wanted to build something to add on to my C64. I think I found the ideal beginner's project in a cheap drum synthesizer kit from Maplin's, a large electronics chain and mail order firm.

Computation is supplied as a packet of components with a printed circuit board. The kit will work with a number of different micros including the C64 and Vic 20. It should also work on a C128 or C64 clone, but I haven't tried it.

The unit provides six separate channels, or different drum sounds. Each channel can be raised for pitch and resonance by altering the setting of variable resistors on the circuit board with a small screwdriver. Software can be used to switch each channel on or off and to control the time between each beat. You might think this would give access to six sounds only. You'd be wrong. The six channels can be mixed in any combination. In effect, this gives you access to a large variety of sounds.

I'm told, by my friend who knows, that commercial drum synthesizers all do more, and the software provided is fancier. The Computation has one big advantage over these - you construct it yourself, and, in the process, learn a lot about the wonderful intricacies of the user press. That's what I now know to call the hole you can feel on the left-hand side of the back of your C64!

Signals, controlled by the computer, come from this port and are

plugged into the Computation unit. Inside the unit these signals are used to generate the six drum sounds. The resulting signals emerge from a lead from the unit that has to be connected to the line-in or audio-in socket of an audio amplifier or monitor.

The packet supplied contains all but a box to house the unit and the leads. For the lead into the drum unit from the C64 computer you need a seven pin din plug, a couple of feet of seven way cable for the six lines plus ground, and a 24 way edge connector to plug into the computer. The output lead will depend on the type of amplifier or monitor or you are going to use. Most commonly a single RCA type plug is required. A very professional looking box to house the unit can be supplied by Maplin for about £5.80. Cheaper ones are available too, or you could probably improvise one.

If, like me, you have never previously assembled electronic equipment, you may start out feeling a bit apprehensive. However, the process is easy. Maplin has a little booklet called *Computer Guide* (ref. 07791). It costs just 25p and tells you how to identify resistors, capacitors and other such beasts. I used the magnifying glass out of my daughter's stamp collection to read the values off the tiny components. I used the value tables for resistors and facets for capacitors on a scrap of paper and then swapped up the components of the same value together in the paper. This meant that I did all

the identification of components (probably the hardest thing of all for me) in one sweep.

Slipping the components into the printed circuit board reminds me of knitting to a pattern, except it's a lot easier than the knitter sweater I laboured over for 18 months! Some items need to be orientated correctly so that the positive end goes through the correct hole in the PCB, but this is always indicated in the very clear lettering on the board itself.

You are advised to solder in a few components at a time, and then solder them into position. You use small wire-cutters to remove the excess wire, pronouncing from the bottom of the board, and repeat the process until all the components are installed.

The last time I used a soldering iron was to mend the spotting that was harder than soldering the components in place. The detailed advice in the *Constructors' Guide* and the project instructions helped me here. Large lumps of blue tack secured the board, leaving two hands free for the soldering. The only items that were at all tricky were the semiconductors because the pins on them are very close together. The finer the point on your soldering iron the easier it is.

Well, putting it all together takes a few hours, but in the process you read the excellent instructions and get a general idea of what each circuit does. Before long you've soldered the leads and it's time to test the unit.

More didn't work! I checked both for whiskers of solder shorting the

tacks on the PCB and the correct placement of components. These were all OK. My mistake was that I had assumed that the wire marked "ground" from the user port would end up attached to the metal shield round the seven pin plug at the end of the input cable. I was informed by my friend, who knows about these things, that only a person with the brain of a small goat would do this but you will might appreciate the tip. The ground wire has to be connected to one of the seven pins. Mine writing the cable was the only connection across I made.

This fixed, I got some convincing drum sounds, but I couldn't work out which of the adjustable registers stored which of the six tones. It turned out to be my misunderstanding of the short programs you type in to run the drums. To turn a line on, or "set it high" as they say, you have to pack the appropriate value into register 58377; for instance binary 10000001 runs on the first line and makes the first drum, called *drum zero*, sound louder.

%00000111 turns on lines zero and one making these two characters of the character set sound simultaneously. My problem was that when the program asked me to type in the drum number, I assumed that line would give me drum number five and so on, that five is, in binary, %00000101, so it turns on drum nine and zero together. In other words you must tell the program to go in a binary equivalent of the binary value of the drum number. If you want drum three you need to type eight ( $2^3 \cdot 2^2$  or 2 to the power of 3). Similarly, drum four is indicated as 16, and drums five as 32 or two to the power of five.

All-in-all, building the Computation kit is very absorbing, and gives you a good understanding of how the computer can be used to control external equipment. From I'm looking for a mid-order DIT robot that will dance to the pulsating rhythms of my drum machine. He who knows about these things says I should get in touch with one of these major types of music

order places that sell a special type of inflatable robot. He says that what I did when airing up the rabbit would stand me in good stead. You have to get used to opaque comments like this from electronics experts when you're an amateur hardware designer.

100

#### **Construction Construction**

第十一章

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#### **Comments and Reply: Remarks**

#### **Pathogens (10%)**

Figure 24

2010-2011 Budget - Page 10

*Regional Economic Report* 100  
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**WPS SOFTWARE, THE AUTHORITIES, AND A PIONEER INTEGRATION.**

the same number of hours spent in prison. Thus, the effect of the death sentence is to increase the average time spent in prison by 1.5 years.

# Software for sale

*If you think that one of our programs looks very interesting, but you can't afford the time to type it in then our software service will help you out.*

**I**t's three o'clock in the morning. You sit at the computer keyboard just finished a marathon typing session entering one of the superb programs from Your Computer. Your fingers reach for the keyboard and press the letters R, U and N. You press RETURN, sit back and nothing happens.

Everyone has probably faced this problem. When it does happen it's a matter of spending hours searching through the program for any typing mistakes. No matter how long you look or how many people help you, you can usually guarantee that at least one little bug slips through unnoticed.

The Your Computer Software Service makes available all of the programs from each issue on both cassette and disk at a price of £5.00 for disk and £4.00 for cassette. None of the documentation for the programs is supplied with the software since it is all available in the relevant magazine. Should you not have the magazine then back issues are available from the following address:

EDINSON LTD, Times House, 179 The Marlowes, Hemel Hempstead, Herts, HP1 1BB.  
TELE: (0442) 48425

Please contact this address for prices and availability.

## The Disk

Programs on the disk will also be supplied as totally working versions, i.e. where possible we will not use Basic Loaders thus making use of the programs much easier. Unfortunately at the moment we cannot duplicate C64 and Plus/4 cassettes. However programs for these machines will be available on the disk.

### What programs are available?

At the top of each article you will find a strip containing the article type, C64 Program etc. So that you can see which programs are available on which format you will also find a couple of symbols after this strip. The symbols have the following meaning:



This symbol means that the program is available on cassette.



These programs are available on disk.

## Please Note

Since the programs supplied on cassette are total working versions of the program, we do not put disk only programs on tape. There is no sense in placing a program that expects to be reading from disk-on to tape.

## NOVEMBER 1986

**DATA THE EIGHTIES** — now you can give your C64 80 column capability, with this program. You have access to two screens either the 40 column version or the new 80 column one.

**C64 SOUND SAMPLER** — now your C64 or Plus/4 can record 800 key sequences you like with the sound sampler. Available on disk only.

**C64 AUTOSAVE** — You've been programming for hours and your computer crashes taking all of your work with it. Well, you can prevent this with our C64 Autosave. This will save your programs to disk or tape every five minutes automatically so you won't have too much work to catch up on.

**DATAMAKER 128 & C64** — Two excellent datamaker programs one for the C128 and one for the C64.

### ORDER CODE

**DISK T128/C64 £6.00**

**TAPE YC128/C64 £4.00**

## DECEMBER 1986

**MIMP** — Create your own graphics operating system in your own programs. Complete with pull down menus and sample icons.

**REMEMBER THE PLUS/4** — An assembler for Plus/4 owners. Complete with a couple of new Basic commands including a MERGE facility.

### ORDER CODE

**DISK T128/C64 £6.00**

**TAPE YC128/C64 £4.00**

## JANUARY 1987

**SELECT MENU 128** — Add a menu program to your C128 disk collection.



# Device One

*A printer interface is one of the most important items you may ever buy. Device One could be just what you're looking for.*

By Stuart Cooke

**W**hen Commodore launched its range of home computers, the need to purchase Commodore products in the future was virtually built in. Should you acquire a disk drive that you would have to use Commodore's. If you wanted a printer then you would have to use Commodore's. All this is due to the fact that the computers have a non-standard interface.

Most of the popular printers such as Epson, Star and Citizen come complete with a cartridge interface making them unusable with a Commodore computer. To solve this problem many parallel interfaces have been built that enable you to use a parallel printer with a Commodore though none of them have been as powerful as the *Device One* from Precision Software.

The purpose of *Device One* is basically to link together a printer with a parallel interface to the Commodore computer. The computer talks to the printer in the normal way i.e. if it thinks it is talking to a Commodore printer while the interface makes the printer behave as though it is a Commodore printer.

The actual casing for the interface is made from what appears to be a VHS cartridge case. The only reservations that I have about the interface are partly due to this. Only part of the circuit board is covered and a large proportion of it is visible to the outside world. I can't help wondering if a metallic object such as a paper clip could find its way into the interface through this opening and cause havoc to the chips inside.

The interface itself contains 192 of RAM and 16K of ROM, there are four built-in character fonts, so you can print things in different faces. There is also the facility to print out in your own fonts, print pictures, calendar and banners.

## Documentation

The manual accompanying the interface was printed using *Device One* and is different from showing the flexibility of the interface. The manual is extremely clear with many examples used to illustrate different functions.

Many of the different commands are extremely difficult to remember, even though the manual does make it extremely clear how to use them, the interface therefore has its own built-in documentation. Hold down the user button on the interface for more than three seconds and a brief summary of the available commands will be printed out for you.

## In Use

Setting up the interface is extremely simple. The interface plugs into the Commodore serial port and the printer connection port. A third connection is made with a transformer to a convenient mains socket.

The interface will work with no less than 25 different types of printer, all of the popular types such as Epson etc. are available. Selection of the printer type is simply made by sliding the position of three switches on the front of the interface. Other switches determine if you require an auxiliary feed and the mode of operation of the interface. There are four different modes of operation, 1325 simulation is, as it says, total emulation of a Commodore 1325 printer, you also have access to all of the *Device One* features such as fonts and calendars.

semi-transparent mode passes all commands directly to the printer without any conversion, however *Device One* commands will still work.

Transparent mode passes characters straight through to the

printer. *Device One* commands will not work.

ASCII mode passes all codes straight through to the printer except for characters. Any characters are translated from Par-ASCII to normal ASCII so that they are passed correctly on your printer.

## 1325 Emulation

When using this mode all of the Commodore printer commands such as double star work as you would expect. This means that you can now use any program that requires a Commodore printer without any problems at all.

## Device One Control

There are no fewer than 32 different commands that can be sent to the *Device One* interface. Commands can be sent to the interface in one of two ways. Either you can open a channel to the printer with a secondary address of 12 e.g.

OPEN 4,4,15

or you can send two escape codes (27) to the interface before a command.

Obviously there are far too many commands available to go into them all so I will concentrate on the main ones.

## Custom Fonts

One command will allow you to select the font that you would like to use. There are no fewer than six variations of this command and for many of them you must have downloaded into the *Device One* font that you require, note this is not the same as one of the four in-built fonts.

You can select a low-res font which

is made up of 9x9 dots. You may select a mid-dot font which is made up of 9x8 dots. A bi-dot font may be selected which is made up of 12x8 dots on an Epson type printer or 18x8 dots on some others.

One of the four in-built fonts may be selected. Figure 1 gives examples of each of these. You can select your printers normal font and Underline can be switched on or off.

### Downloading

In order to get fonts etc. into the interface you must select one of the seven download commands. Commands exist to download each of the different styles of font as well as

each line of the picture is printed. Should you send text to the printer you could print this over an illustration.

### Printing Calendars

There is an in-built calendar mode in the interface. This simply prints out a calendar for a specified month on your printer and can be printed in any font.

### Banners

This mode will allow you to print any message sideways on to your printer, each letter of your message being as high as the width of the paper.

FIGURE 1

**THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG BACK.**  
**THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG BACK.**

**THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG BACK.**  
**THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG BACK.**

**THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG BACK.**  
**THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG BACK.**

**THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG BACK.**  
**THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG BACK.**

downloading a picture into the interface's RAM, sending a test file so that it is printed in transparent mode and downloading a disk drive to the printer. Downloading is extremely slow since once the interface is told to download it waits until you send it the necessary information. The easiest way to do this is to VERIFY the file that you require. This file isn't read into memory but is sent down the bus to the interface.

### Printing Pictures

Pictures can be printed in either full-ton or half-tone. Full-ton simply means that the image is in black and white while half-tone means that the interface will use shading to print out the different colours. In order to print a picture it must be downloaded into the RAM in the interface. Then each time the interface is told to print a line

### Laying It Out

Commands exist within the interface to set the page length of the interface and the left and right margins. For anyone who uses a wordprocessor that doesn't have header and footer commands the inclusion of this in the interface will be a welcome addition. You could even use headers and footers to print messages at the top and bottom of any listings that you print out.

### MLQ

Many people would like to have access to a daisy-wheel printer which prints extremely clear characters, however for most of us the price of these is far out of our reach and we are therefore stuck with the dinky products that our printers provide. The MLQ mode of

the *Devicer One* does improve these dramatically by printing each character twice. This gives a more professional finish to any printers.

### Software

Not only does *Devicer One* come complete with its own built-in software, it also comes complete with a disk full of it for the C64. The software included is:

Printview - This allows you to convert pictures from most of the popular packages to *Devicer One* format.

Font Editor - This allows you to create your own fonts for use with your printer.

Dump All - This patches into your machine and allows you to get a screen dump at any time by holding down a few keys.

Dump Text - Similar to the above but this only prints text.

Draw! - A simple drawing package that allows you to create your own free pictures.

Print Utility - A program that makes printing calendars, banners or downloading pictures and fonts much easier.

Font Captain - This allows you to go through the memory of the computer so that you can capture any fonts that are used within your programs for use with your printer.

### Verdict

*Devicer One* is the most powerful printer interface that I have come across for the Commodore range of machines.

The interface is easy to use and the manual is clear enough for even a novice computer owner to get to grips with the interface without any problems.

The interface is expensive but well worth using your printer for, and especially since there are interfaces in the market that don't do as much and cost more.

### Touchline

**Product:** Devicer One.  
**Company:** Precision Software, 8 Park Garage, Worcester Park, Surrey KT4 5LZ. Tel: 01 388 7768. Machine: C64/128.

# CP/M and the Commodore 128

*CP/M, much neglected mode of the C128, is probably the most useful for the serious user. Here we examine the Commodore version of this pacesetter.*

By Mycroft Appley

**T**here are differences between the definitive CP/M and the Commodore implementation, however this article should enable you to understand just what those differences are plus I hope to give you an idea of the more common function programs supplied with the CP/M+ system.

## The Commodore Connection

If you read my article in *Your Computer*, March 1987, you should remember that, the CP/M system, as now defined, requires a 320 processor, 64K, an 80 column screen and one or two disk drives. The CP/M+ system, supplied with the C128, assumes 128K.

In the Commodore implementation there are a couple of changes made in this initial specification. The screen can be in either 40 or 80 columns mode and, as most people can only have one disk drive, there is a software mechanism for treating it as two separate drives so make copying and various disk functions easier.

This is achieved through the use of drive 'E'. Normally to copy between two disks you need two drives, for instance 'A' and 'B'. The computer takes the information off drive A and puts it on to drive B. That works fine for dual drive systems, but most Commodores only have one drive, which makes things rather difficult. So Commodore came up with the drive 'E' system. Specifying a copy between drives A and E is like a single disk copy with drive A referring to the original and E referring to the copy. Although, you can do it the other way around. The main point is that drive E doesn't exist. Only in the mind of the system's

programmer and everybody knows that most system programmers are daft anyway. This system is very good and simple to use and is a brilliant way around a rather sticky problem. It's much more usual for Commodore to have something like that for the user to sort out.

## On Screen

The other anomaly in the Commodore CP/M system is the ability to use a 40 column screen. This is for the legions of C128 owners who have no 80 column monitor but just one of the old composite colour monitors or TVs. It operates by having a 40 column window on a logical 80 column screen. Everybody must recognise this from a large number of wordprocessors that run on the C64. This is probably the most ideal solution and the only real way to get some of the software working. This said, it is probably better to find a cheap green screen monitor and use that instead. There are some very good ones available for around £50 and it is worth the investment if you are going to use CP/M for any length of time.

Through CP/M+ was designed to have a certain amount of room in the OS for graphical links, CP/M 2.2 – the operating system that most CP/M programs were written under – has none. So most CP/M programs are monochrome anyway. Other than that you are best sticking to software that will run under 40 column CP/M like languages or programs written for the old C64 version of CP/M 2.2.

## On the Record

The other difference that is inherent in

all CP/M systems is the disk format. The disk format is the way that the disk controller talks to the disk drive to write to the disk. As most people know, the process of writing to a disk is very similar to that of writing to tape. To take this analogy further, there are different ways of writing to tape and two distinct writing systems. One is 'Helical Scanning' as used in video recorders and the new Digital Audio Tape (DAT) system. This is incredibly complex and is beyond the scope of this article. The other method is the straight linear recording system.

Using this method, a certain amount of tape will pass the tape head in a certain amount of time. In that time a certain amount of data will be written to the head. There can also be between one and nine tracks on the head. Now as we know, different computers have different methods of writing data to tape; on tape this is known as the tape format. But, on disk it is known as the sector format. Also, the way in which the head writes to the tape is different, effectively how the varying magnetic field of the head affects the tape.

All these differences also apply to disks. The amount of data packed onto a linear of a disk is called the sector density and can vary between five and 10 for CP/M disks on 16 and 32 for Commodore disks. The number of tracks on a disk can vary between 10, 40, and 80. There are three main ways of writing data to the disk: FM, MFM, and Commodore GCR. And there are one or two other differences as well.

So, now you see that there are a lot of differences between disks, even

though they are the same size (imagine poor old Amstrad users who even use different types of disk!) the C128 has to be able to read many formats as possible to be able to make the best use of CP/M. To do this a novel solution was found.

### The Solution

In the past, Commodore computers used 32 (or 21 for older machines) track, GCR, 22 to 16 sectors per track and 256 bytes per sector. This format was designed from the start to be reliable, fast, and makes the best possible use of disk space. And indeed the figure of 180K for a single sided, single density, 15 track disk has never been beaten. However, the rest of the world started with very low density disk drives and could only modify their system as the hardware got better.

As you can see, there is no reason with an old Commodore drive can read the more standard type of disk. So all you people with 1541s – hang back. You can use Commodore specific CP/M programs (and there are quite a few available from KPMI.COM) but you won't be able to accompany any of the generic CP/M stuff.

No, to read CP/M generic disks you need to have either a 1570 or 1571. The difference between the two is that the 1571 will read and write to both sides of the disk and the 1570 is only a single sided drive. What this means is while you could read some CP/M disks in the single sided drive, you may have to get them specially written or only be able to read half the information. So get a 1571, this is the same drive as the one that is fixed internally into the C128!

The 1571 is 40 track double sided, is capable of FM, MFM, or GCR, and can hold 200K, 400K, or 800K. This last mode is the double sided Commodore GCR format and is only really used by the C128 or Commodore 64s mode and when boosing CP/M. 200K is available in FM or single density mode and the 400K mode is MFM or double density mode. These two modes could make the C128 read 90% of all CP/M 32 disks ever written, but instead, the most popular disks are provided. This still covers the vast majority of CP/M disks, they are

IBM 9 sector SS  
KayPro II  
Osborne SS  
IBM 8 sector DS  
IBM 9 sector DS  
KayPro IV  
Delorean DS  
Epson QX 10

The three four formats can be read by the 1570, all formats can be read by the 1571. It is interesting to note that the IBM 9 sector DS is the same format as used by IBM compatibles when using CP/M-86. This was the Digital Research answer to MS-DOS, that never really took off. However, many IBM compatibles retain the ability to read or write disks in this format and so date only transfers are possible. Another side point is that the Amstrad CP/M machines (PCP 404 with disks and CPC 664) and CPC+ machines (CPC 6128, PCW 128, PCW 8121) can read and write disks in this format.

### Transient Commands and Friends

Last month I explained the concept and purpose of the transient commands along with some of the simpler ones that are only really extensions of the blank or residual commands. After this come the utility programs that can either be considered as transient commands or programs in their own right. They are usually used as commands when only one operation is needed, while for multiple operation the stand alone program mode is more useful.

The most commonly used, and indeed one of the most useful commands is known by the incredibly informative name of PIP. PIP stands for Peripheral Interchange Program, and has been called 'the most powerful command ever written'. This uses the definition of print that derives from making a lot happen from the fewest keystrokes possible. However, this is more to do with PIP's convoluted shorthand system than anything else. Effectively, what PIP does is to transfer a file from one device, perform some action on the file (or not as the case may be) and transfer it to another device.

This command is exceedingly useful, has to be included on the system disk, and is rarely ever documented in CP/M instructions supplied with any CP/M machine. So

here is the minimum you will have to know to get it going.

### PIPped at the Post

As mentioned earlier PIP is used to transfer files around. The easiest way of using PIP is to type 'PIP <xx>' where '<xx>' is the function that you want to happen. When this is completed or an error occurs you will then drop into the CP/M system prompt '(A) > 1'. The programmed method of using PIP is just to type 'PIP' on its own. You then get the PIP prompt which is an asterisk (\*) followed by the cursor. To use the earlier example, if you typed 'xx>' after this prompt it will be acted upon. The difference is that after it is finished or a recoverable error condition occurs, you will drop back into the '(A)' prompt ready for another command.

The format for the PIP instructions (I will assume from now on that all instruction are following the '(A)' prompt) is Target source source operation'. Either the target or the source can be either a file name or a device and the operations will be detailed later. The file names can support all the wildcards and drive designations that the more complex transient commands have. To the most simple example of the PIP command is the disk copy 'A:<file> <B:<file>' will copy the contents of drive 'A' on to drive 'B'. Single files, and groups of files can be copied or even renamed. 'Tran1.txt = file1.txt' will change the text file 'file1' into the text file 'Tran1'.

The main use of PIP is to transfer information between devices. 'Temp1:temp2' will accept input from the keyboard and create a quick test file. 'LPT1:temp1.txt' will print out the test file and something like 'BBCtemp1' will read information from the serial port (perhaps from another computer) and create a file with it.

However, the most powerful function that PIP has is the operation at the end of each instruction. The examples above will do the transfer with no change in the file being transferred. However, the inclusion of a few letters after the instruction in square brackets can change everything.

- Z : This zeros the parity for the 7-bit ASCII files.
- W : Overwrite, this will



# Keypad Modifier

*How you can use your numeric keypad to type in lots of data statements.*

Dr. Mohammad Hassan Memon

The Commodore 128 comes with an excellent keyboard which is complemented by a numeric keypad situated on the right. At first glance this would brighten any programmer's heart. You could be mistaken for thinking that it can be used for keying in data statements. But, as soon as careful examination is made, it becomes clear that the keypad has been primarily designed for accounting data entry with '+', '-' and '\*' keys. Normal BASIC data statements cannot be entered with it. Or can they?

I realized, that with a little effort, the kegpal could be refined to meet the need. Hence the birth of the Kegpal 3D printer.

Fingerprints

This is a machine language utility which resides at the unused RAM at \$0000. This start location is defined in line 61 as variable AD. The value of this can be changed if required and a working version of the program will be POKED to that location and executed.

The program redefines the "F" key as DEL. This is useful when you make a mistake in your data statements. The "F" key is located on the top right of the keypad just like the IDEL key on the normal keyboard, and this makes it very convenient to use.

The "C" key, when depressed, prints the word DATA on the screen. The

cursor, required to separate the numbers in a data statement, is now available using the **U** key. The number and ENTER (or RETURN) keys must be used.

Wiley on Demand

The Basic loader accompanying the program POKEs the data. If you own a disk drive, the loader will generate a binary file with the name you specify. Later, whenever you want to use this utility, just enter **MLOAD "FILE NAME"** to load and activate the machine.

Tape owners can enter the built-in MONITOR and save the machine code with: `S"FILENAME",J1+5000,+DISP`. The machine code can then be loaded with: `LOAD "filename",J1`. You should then type `MEW` and `SYN:SAVE` to activate.

100

The best way to use this utility is to first use the A1/I1 feature of BASIC. Type in the first line number and press space. Now you can forget the main keyboard. Just press the  $\downarrow$  at the beginning of a new line, the number of which will be automatically printed if you are using AUTO. Then enter the numbers pressing  $\downarrow$  to separate them and press ENTR to end the line. If you make a mistake press  $\leftarrow$  to delete

www.wiley.com/go/robinson

# Go FORTH & \*

*Tired of your old programming language? Want to try something new and exciting? Then it's about time you checked out FORTH.*

By Allen Webb

The title of this first article may at first appear odd but it is, in fact, a motto used by the FORTH Interest Group (FIG) meaning "Go FORTH and multiply". What I intend to do is propose some arguments in favour of the use of FORTH as the alternative programming language.

## Basic Disadvantages

The majority of Commodore users are probably programming in Basic. While Basic adequately fulfills its original function as an aid to teaching programming, it has serious drawbacks which hinder its use for serious applications:

- i) Basic lacks the structural constructs which ease the creation of logical and easily understood programs. If you've ever tried to understand, after reading a Basic program written by someone else, you'll know what I mean.
- ii) Being an interpreted language, Basic is both slow and uses memory inefficiently.
- iii) Basic is inflexible.

Two important points must be emphasized. First, the enhanced Basics available to BBC and IBM clone owners are more efficient to use but are

obviously machine dependent. If you want to have a program which is transportable to other machines, forget it. Secondly, you can get compilers which will speed up execution and save space. They do not, however, make the job of programming easier.

For all these reasons, many people will eventually become dissatisfied with Basic and will seek an alternative. Those interested in arcade games, will generally choose machine code. These, however, who do not seek the highest speed execution will want an alternative high level language. For the

C64/C128, the alternatives are limited to PASCAL and FORTH. Those of you who own an Amiga will also have the option of CPASCAL (and its derivative MODULA). A powerful and well structured language but for power, structure, speed and elegance, FORTH takes some beating.

## Forth Advantages

I do not intend to describe the FORTH language in detail since the books listed later will do the job better than I can. Instead, I want to discuss the

```

Listing 1
HEX
D021 CONSTANT SCREEN-COL-REG
:COLOURCHANGE
    L SCREEN-COL-REG    +1 ;
: FLASH FF 0
    DO
        COLOURCHANGE
        LOOP;
: MESSAGE FF 0
    DO
        "FORTH RULES OK" FLASH
        LOOP;
DECIMAL.

```

FORTH philosophy and hopefully when you appear.

The main difference between FORTH and other languages is its approach to defining instructions as words. In Basic, instruction such as MIDS, I, PRINT etc. have fixed and clearly specified functions or meanings. Whilst FORTH uses a vocabulary of basic words (primitives), they are completely flexible and may be changed at will. If, for example, you want the instruction 3 to really represent 11, it is a trivial matter to make the change. This ability to define your own words and add them to the vocabulary gives programming an added dimension. It also makes the creation and use of Procedures both primitive and awkward.

Consider the example in Listing 1.

Here I have defined three words, COLOURCHANGE, FLASH and MESSAGE. Each definition is held in the union between the : and ;. COLOURCHANGE increments the screen colour (in \$0020) by one. FLASH uses a loop to increment the screen colour 255 times. MESSAGE uses the flashing colour effect in conjunction with a printed message to give a nasty effect. The three words are added to the vocabulary and can be used in any subsequent words. In other words, a completely user definable language.

If this flexibility wasn't enough, FORTH offers a combination of interpreter and compiler. When you write the programs, you are in fact creating some form of machine language code. When any word is to be executed, the fact is compiled. Since the primitives are efficiently defined in terms of simple machine code jumps, the compiled words are converted to a single linked list of machine code instructions. This results in compact code which executes quickly.

### Inside FORTH

Originally, FORTH was written using virtual memory held on disk. To do this, text is held in a series of screens each comprising of 1024 bytes. Within these screens, the text can be laid out in almost any format allowing the use of

indenting and other tricks to give a well structured format as shown in Listing 1. Since many C64 users don't own a disk drive, many FORTHS use a RAM-disk approach to storing screens. Whilst the software is different, the perceived mode of operation is unchanged. This system of text input is extremely satisfying since the use of virtual memory on disk presents no penalty for using explanatory comments. Listing 1 shows what can be done.

In terms of capabilities, standard FORTH offers all of the structure you

Much of the speed and power of FORTH derives from use of a stack to hold values currently in use. Not only does the stack allow the rapid manipulation of data, but values can be easily passed to words. The word DUP in Listing 2 is used to duplicate the value at the top of the stack. The functioning of the routine is as follows:

1. The positive is entered with the number on the top of the stack.
2. It is duplicated to preserve it and it is decremented.

```
Listing 2
: FACTORIAL (n - factorial)
    DUP 1- IF
        DUP 1- MYSELF *
    THEN ;
```

could ask for. The standard constructs are:

```
DO...LOOP
IF...ELSE...THEN
BEGIN...UNTIL
BEGIN...WHILE...REPEAT
```

CASE is not standard but can be easily implemented. Using such constructs with the simple "word" system, it is remarkably easy to develop a linear approach to programming without recourse to unsatisfactory constructs such as GOTO. In addition, the ability to nest words is conducive to the analysis of a problem by use of top-down design.

Here are a couple of further examples. Listing 3 shows a routine for the calculation of the factorial of a number. The routine is recursive in that it calls itself via the word MYSELF.

3. If the number is greater than one, the routine calls itself.
4. If the number is equal to one, the results of each call itself are multiplied together.

You might find it interesting to compare Basic routine to do the job in Listing 2.

Listing 3 also uses recursion. Can you sort out what it does?

Listing 4 gives a final example. This time I have a real application. Three example screens are shown for a music system on a Texas TMS-32010. Listing 4 is AY-3-8910. Don't try to understand how it works - simply consider how neat the lay-out is and how unlike a normal program it is. The use of normal English gives a user-friendly program which is easily altered by another user.

```
Listing 3
: TEST (n - n)
    DUP <
    IF
        SWAP MYSELF
    ELSE
        DUP 0=
        IF
            DROP
        ELSE
            SWAP OVER MOD MYSELF
        THEN
    THEN ;
```

**Listing 5****Screen 1**

(Words for AT-3-FORTH Programmable Sound Generator)

VOCABULARY MUSIC MUSIC DEFINITIONS ROM #2- LOAD 1 PGK Words

VARIABLE TEMPO :20 TEMPO ;  
1: ON :254 7 PGK ; 1: VOLUME :4 PGK ; 3: VOLUME1: FREQ CREATE , PGK-#1 154 PGK  
1: C flag for use by DOTTED ) ;

: DOTTED NOTE ; (DOTTED changes flag value left by a note )

```

1449 FREQ CS 1413 FREQ CS 1716 FREQ DD
1246 FREQ DS 1198 FREQ DS 1123 FREQ DD
1043 FREQ FS 1009 FREQ CS 916 FREQ AB1
851 FREQ A1 812 FREQ B1 774 FREQ DD
227 FREQ C1 708 FREQ C1 647 FREQ DD
130 FREQ D1 595 FREQ D1 561 FREQ F1
327 FREQ E1 558 FREQ E1 471 FREQ G2
443 FREQ A1 421 FREQ B2 396 FREQ B2

```

**What's Available**

So you've had the sales pitch and you're hankering to start hacking in FORTH. There remains the question as to what is available.

First, there is the software. The first point to make is that FORTH users are a sensible lot when it comes to making systems available and it should be a simple matter to get hold of a public domain system. Try contacting the FORTH Interest Group. Alternatively, there are a few systems which can be obtained for disk.

Probably the most powerful system is Hilti Lightning from Class. This was marketed as a game package and consequently offers a large number of graphics extensions. Both external memory on disk and RAM disk versions are available. Highly recommended.

Melbourne House publishes Alesnelli's *FMS FORTH* for the 64. This offers some graphics extensions but is otherwise quite standard. Although it is simple to transfer it to disk, only RAM-disk is supported.

EDSINK (now defunct) offers no full FORTH. This is quite a decent version and, if you shop around, you may pick it up cheap.

There are also versions from MPE and FORTHWITH but I have not evaluated either.

If you're really cool, trendy and looks, you might be able to pick up a

bibliographed but two are worthy of comment. Both are by the same author, Leo Brodie. *Teaching FORTH*, Prentice Hall, ISBN 0-13-842923-7; *Thinking FORTH*, Prentice Hall, ISBN 0-13-817588-2.

Both are worthy additions to any serious computer user's library and suitable for users of all abilities.

I hope you have found this brief summary of FORTH of value. Unlike many languages, FORTH has the power and flexibility to grow with your own abilities and provide an effective and elegant solution to your programming problems. **BB**

**Timeline****Robofield Ltd Computing**: Stour House, Hobson St, Cambridge**FORTH Interest Group**: Cullen Walk, 24 Wild Estate, Wokingham, Berks RG11 4UL**FORTNITE**: 31 Rusley Moor Rd, Rushmore, Lancashire OL12 7AL**Microprocessor Engineering Ltd**: 21 Rusley Road, Shirley, Southampton SO11 4QL**Melbourne House**: High Street, Hampton Wick, Kingston-upon-Thames, Surrey KT1 4BL**Basic Software**: 12 Walford Rd, Weston-Super-Mare, Avon BS24 1GD

**Jupiter Ace**. For you who haven't heard of it, the Jupiter Ace was a FORTH based micro rather in the mould of the ZX81 (try Boldfield Ltd Computing).

Unfortunately, the instructions with most low-cost FORTHS are poor and must be supplemented by bookwork. The range of books is wide (the FORTH Interest Group has a

**Screen 2****(Basic Vocabulary 3)**

```

1: NOTE CREATE , P TEMPO # * (basic note duration )
      SWAP IF 3 2 = ) THIS IS 1 adjust if dotted )
1: +PGK 0 -PGK 0
0: 1 DD LOOP .BYT
10: 2 DD LOOP .1

```

256 NOTE DRIVE 128 NOTE SEMI-BEATS

64 NOTE BEATS 32 NOTE CROTchet

16 NOTE QUAV 8 NOTE SEMI-QUAVES

4 NOTE SEMI-BEAT-QUAVES 2 NOTE SEMI-SEMI-QUAVES

**100 TEMPO :**

```

882 DOTTED QUAVES 62 SEMI-QUAVES
882 QUAVES 62 QUAVES AND QUAVES
62 QUAVES AND QUAVES AND CROTchet
F1 QUAVES GL QUAVES AND CROTchet
62 QUAVES AND QUAVES AND CROTchet
882 DOTTED QUAVES GL SEMI-QUAVES
882 DOTTED QUAVES GL SEMI-QUAVES
F82 QUAVES AND QUAVES
G1 QUAVES AND QUAVES AND CROTchet
F1 CROTchet AND CROTchet
G1 QUAVES ED1 QUAVES ;

```

# Expanding Systems

*Many people who bought the Commodore Sound Expander may have found it too much for their novice status. Perhaps this Music Sales Composer Editor will help.*

By S.J. Chance

**D**id you buy a Commodore FM Sound Expander Package earlier this year? Did you drill to the Country Banjo and Teletar demonstration? Did you then find that your keyboard talents, no matter how great, would not allow you to produce anything sounding half as good as what the machine could play on its own? Discouraged, did you give up your Learn to Play Keyboards course, and leave your £150 investment gathering dust under your bed? If you have answered 'yes' to any of the above questions, then here the good news: the long awaited Composer/Editor software for the Sound Expander has arrived, and even at the slightly painful price of £34.95, it's a must.

At the time of writing, only the disk version was available, and that only with a photo-copy of the instruction manual, but a cassette version should be with us soon.

## The Composer

The disk contains two separate programs: the FM Composer and the FM Sound Editor. I will deal with the Composer first. This allows you to enter standard music notation as in a double staff, over four channels. The notes can be input from the external (Fresche) keyboard, nothing new to MIDI fanatics, but to those of us who have struggled up through DVI-Synth, *The Music Studio*, *The Sound System*, etc., this is a new experience in terms of ease and speed.

Of course, if you don't have the external keyboard, notes can be entered from the computer keyboard, though this is a much more cumbersome way of doing things. Having the computer keyboard operating as a music keyboard doesn't mean that a lot of other functions are relegated to the remaining keys.

Dotted notes, ties, triplets, dynamics, variations in tempo, all are supported by the program, but they are entered via a system of using the function keys to scroll through the options, which I found irritatingly clumsy.

Another rather grim job is that to move the cursor from the beginning of a music-line to the end involves a back-hunting to wade through all the music in between which, with a piece of any length, can take a couple of minutes. The thing to do here is to break the music down into smaller sections with the 'separates' option.

Repeats in the music are supported, including repeats with different endings, which establishes to make optimum use of memory space, note that the program doesn't leave plenty of RAM available.

Once entered, your music can be saved onto to disk from the disk version, edited, and dumped to a Printer. The Print-out is more readable than 'notes', and doesn't have the problem of overlapping quavers appearing to be semiquavers which occurs with *The Music Studio*.

This music can be played back in

whole or in part, at any stage, and in any of 64 different voices.

## The Editor

Moving on to the Sound Editor, this does exactly what it says it does. The sounds from the existing library can be altered, or new ones created. There are quite a few parameters to muck about with, and you don't have to have a clue what you are doing to get some interesting results. If you are short on inspiration, there is also a 'Piano Machine' option which sets-up the parameters at random.

The sounds can be played from the external keyboard, and it is possible to set a keyboard-split, in a similar way as with the original Sound Expander Package. There are also two extra sets of voices which were omitted from the cassette version of the original Sound Expander software.

Also within the editor program is a create drum machine, using five drums over 32 program steps. This is not as sophisticated as sound or programming as dedicated drum machine add-ons, but is quite respectable nonetheless.

Both the Composer and Editor are MIDI compatible through a relevant interface. If reading about MIDI has given you a headache in the past, using both these programs with the Sound Expander may well open your eyes, and eventually your wallet, to the potential that MIDI provides. TH

# Letter Writer

*If you write a lot of letters and get fed up of using boring paper and pen, try this novel way to communicate with fellow C64 owners.*

80 Les Allumés

**T**his routine provides a novel way to send a letter, or indeed any form of communication, to a friend or fellow 64 user by providing a musical accompaniment to a tele-text type format.

#### Using the Program

Simply type in your letter from the keyboard using all normal print commands. To make alterations or emphasis parts of text in different text colours, the font by enhancement.

qualitative planning results can be ascertained; the routine can also be used to draw or provide simple animative sequences.

When you are quite satisfied with the finished product hit the F1 key twice to initiate the save process. This relocates the text, cursor and file routine to start of Basic with a relocation program to save a single file of 29 blocks in length.

The program works with either disk or tape; the device being selected by monitoring the current contents of RHL.

The program can be further  
extended by TURBO C++.

The maximum test length is restricted to 40% which provides sufficient room for most applications.

The program must be typed in exactly as listed and saved prior to running. Error trap routines are included to ensure that the data entered is correct. The program then saves the relevant code at a temporary address of \$00000 and then prompted releases the working program to basic (\$00001), and causes the program to start.







ROUTINE THAT WILL SEND A LETTER, OR ANY FORM OF COMMUNICATION, TO A FRIEND OR FELLOW STUDENT BY PROVIDING A MUSICAL ACCOMPANIMENT TO A TELE-TEX TYPE FORMAT. SIMPLY TYPE IN YOUR LETTER FROM THE KEYBOARD USING ALL NORMAL PRINT COMMANDS TO MAKE ALTERATIONS OR EMPHASIS PARTS OF TEXT IN DIFFERENT TEXT COLOURS. IN FACT BY EXPERIMENTATION QUITE PLEASING RESULTS CAN BE ACHIEVED; THE ROUTINE CAN ALSO BE USED TO DRAW OR PROVIDE SIMPLE ANIMATION SEQUENCES.



# Red Boxes

*Now there's a home control system available for the C64, which will switch on the kettle and the telly or even warn of intruders.*

*By Mycroft Appleby*

Home control has always been promoted as one of the major uses of computers in the coming year. However, in the past home control systems were expensive, difficult to use, and were only available on micros with good, complex interfacing systems like the BBC Micro. More common computers like the Commodore 64 were not really used at all. One authorized user port that doubled as an RS232, and an obscure custom serial system, isn't really the stuff that interfacing dreams are made of.

Finally, there is now on the market an easy to use home control system that is available across a range of micros including the Commodore 64. The starter pack for *Red Boxes* comprises the main controller — called 'Red Leader', and two control units — an infra-red receiver (red box) and a plug actuator (red cat). The concept behind the *Red Boxes* is the controller unit 'talking' to all the other units via a modular serial link via the mains.

Red Leader is a computer in itself. Comprising a 6502 derivative processor just like the C64, 8K of RAM, and a BBC-like control Basic. The Commodore 64 connects to this and is used as a terminal. The way this is done is extremely clever. A serial connection on the C64, Ports 'Run/Stop' and the Red Leader behaves just like a cassette player, sending cassette-type signals to the Commodore 64.

After a short time the terminal program is loaded into the computer and the link between the Red Leader and the Commodore 64 turns into a proper two-way serial link. You will then drop into the control program mode.

This mode is the simplest operating method on the *Red Boxes* system (the other being Red Basic, but more of that later). You are presented with a menu where you can log-on devices (i.e. tell Red Leader that they exist), type in their code addresses, turn them on/off and set them up to turn on or off at specific times. You can even relate the input of one to the output of another so that a movement on the infra-red detector will activate an alarm for instance.

This program, whilst being extremely simple, is also quite powerful and lets you perform all the major actions that you would want to in a quick and easy manner. However for complex, multi-unit, interaction you need to get down to some planning and programming. For this you need to use Red Basic and probably need to get hold of the Projects Manual (good value at £15).

## Documentation

The manual supplied gives you some simple information on the Basic, but is really aimed at the inexperienced user so goes into more detail about the menu program. The Projects Manual

on the other hand, is one of the better ones that I have read. Going into enough detail for the experienced programmer, yet to do something really flashy, as the beginner who is as lost with Commodore Basic and wants to get down to using Red Basic.

If you have ever used a BBC micro you will be immediately used to Red Basic as Red Basic is a subset of BBC Basic, with a lot of extra commands added to handle the control aspect of the system. If you think that Red Basic being the same as BBC Basic is a little strange, then you won't when you hear about the Foundation of General Information Systems (the people who make Red Boxes), Chris Curry (at it is he) started Acorn many years ago and this is one of the first projects that he has embarked on since the Acorn broke up.

As well as most of the BBC Basic commands and instructions — which includes most of the structured programming aids (repeat, gosub, name, long variable names etc.) there are commands to log-on devices and manipulate them. As this Basic is a lot more advanced than the Commodore 64 Basic, you should have no trouble at all in telling units to do whatever you want, especially with the real-time commands. These are commands that are very similar to some commands on the Amstrad. Sections of program are executed when an external device instructs them. So if the timer section of your program is controlling the

heating and a burglar trips the infra-red motion detector then the 'alarm' section of your program can be activated.

8K may not sound like a lot, but try and think of the last time that you wrote a program that was actually 8K in length. Remember, you don't have to worry about screen or colour memory, or sprites, or sound. The Commodore 64 handles all of that. And if Basic is a bit tight you can always switch to machine code.

The Red Leader uses a 6502 processor, and you can program it in machine code by poking code into memory and then executing it. The Projects manual carries a list of operating system functions which are very similar in a lot of ways to the Commodore Kernel System. The BASIC has the same memory management aids as the original BBC BASIC with pseudo-variations like Page and Top to indicate where the BASIC program is going to sit, and LOMEM and HMEM to reserve space for the machine code area. The operating system and memory areas are also very similar to the BBC, even down to where the system memory ends.

The BASIC can also save any programs written under it to a tape connected to the Commodore 64. To do this, the Red Leader first transfers the contents of its memory to the C64. You need then disconnect Red Leader and connect up a tape recorder, and write to tape. Then re-connect everything up.

The main plus of this system is that when you have a program debugged and working to your satisfaction, you can unplug the Commodore 64 from Red Leader completely and use it for something else or whatever. Yet, Red Leader will just sit there executing your program forever. However, you can leave your Commodore 64 connected if you want to — if you need to see information displayed on the screen for instance — though the power consumption over a period of time would be obtrusive. The Red Leader on its own uses up very little power, and it is feasible to leave it switched on all the time.

#### **Reds One and Two**

The two units supplied with the starter pack are Red One and Red Two (research a bit like something out of *Apocalypse Now*). Red One is the

actuator. This is a unit that plugs into the mains at one end and then has a mains socket at the other. Anything you like can be connected to this and turned on and off from Red Leader. There is also a manual override on the actuator to toggle it on and off as you see fit. An LED on the box tells you whether it is on or off.

Red Two is an infra-red motion detector. One end plugs into the mains usually at the other end is a small box about half the size of Red One and Red Leader. In this is a large window. If anything that is at a different temperature than the surrounding air moves within 16 feet of it then a signal is sent back to Red Leader.

All three units come with wall mounting brackets with all screws and fixings, though they don't need to be well mounted, it is excellent that these are included. The cables are also very long, over six feet in most cases. This is just about the right length. Usually an system such as this the cables are not quite long enough. I think that they got it right this time.

In the near future GIS will be releasing an alarm unit and an analog input unit. These will allow you to build up an alarm system more easily or control a thermostat for heating. Next in line are temperature probes and an 82332 board.

This last unit will allow your computer to talk to a printer in another room, or even another

building, by sending its information down the main line. This could also be used in networking computers in a simple and easy manner.

If anyone is worrying about the mains system, don't. It is perfectly safe and very well worked out. Each unit has its own unique serial number and the Red Leader has to know what it is. So while you could control your next door neighbour's heating system, you'd have to know his encryption code first. However, if you wanted to communicate with a friend down the road, as long as you were on the same local ring route, and within a few hundred yards, you could do it.

#### **Verdict**

On the whole this is a brilliant system. One of my main interests in computers is in the field of real event control. And this is the easiest to use, safest, and most well thought out system that I have ever seen. This only obviously in its path and public resistance to this sort of thing, and the price which, though low for a control system, is still high for the average Commodore owner. I will watch this with interest.

#### **Touchline**

**Company:** General Information Systems, 7 White Hart Road, London E7 1BY. Price £129 (starter pack).



# Letters

*Your opinions are what counts. Let us know how you feel about anything connected with Commodore computers.*

## Fat on the Back

**M**ay I congratulate you on the new layout and style of *Your Commodore*. It is a great improvement. I am glad to see you have stayed away from the craze in other magazines for catering for games players at the expense of the rest of us. The contents seem to me now to be just about right. The magazine is well laid out, with a good clear typeface and the typefaces are much clearer.

There is only one fault. Out year price is under twice what we pay for *The Grapher*? I ask this as I have spotted a number of typographical errors throughout the magazine.

*Your Commodore* must now go to the top of the class for getting the formula right. I buy most magazines for the Commodore including some American and Canadian ones. *Your Commodore* is now the best for lay out and content.

The free tape has gone into my collection of utilities. I already had most of the utilities buried in two such useful programs. I will be using them often.

As an amateur in my mid-forties, I find using my computer for letter writing and working on a novel (for enjoyment not for publication) very relaxing after a hard days work on the roads as a council worker. Keep up the good work.

David Peacock, Fleetwood

Thank you for your all too well deserved prize, David (well, why be modest). Our press' regular has been unusually whipped and flogged in its fury and such time as she sets the score of her ways!

Ed.

## Labour of Love

**H**aving recently received my copy of *Your Commodore* January '87, I was interested in a article by Stuart Cooke on Fault Finding. I am sure that a lot of readers will find it very helpful.

I was not long after purchasing my first computer that I came up against a problem which I found very frustrating. It was the difficulty of typing in a listing without making mistakes. Although I can type about 20 words per minute when writing a letter, it is quite a different problem trying to read the listing and type at the same time. I have to see the keys and see where my fingers are going. This when constantly having to stop and read the listing, then remember it, the task could be quite tiring.

After giving the matter some thought I devised a method that has worked perfectly for myself, and perhaps it may be of use to others.

I record the whole program on a tape recorder at such a speed that when played back, it allows me to sit comfortably and type directly away without having to take my eyes off the keyboard. If a fault occurs and is inserted in the recorded line for stop and start of the recorder it is possible to stop at once correct the mistake, or if the recording has got a little ahead of you, typing catch up before operating the fast switch once more.

It does take time to record the listing, but the elimination of constant mistakes in typing and most of all the frustration of continually correcting them, has been a great boon.

I hope that this suggestion will be of value to other readers.  
Flight Lieutenant Class R.A.F (RAF) Harlepool.

If any other readers have ingenious time saving ideas, perhaps they would like to pass on their pearls of wisdom for the enlightenment of the masses. Ed.

## Dissillusioned

**I** refer to the letter from H.Jackson in your January issue. I am afraid that I do not share his enthusiasm for the C64/Plus4 User Club.

Having paid up subscription in mid-November, I am still waiting for the so-called 'magazine' for November, December and January. '87 User' did appear in August, September and October in a very poor B/W A4 pamphlet.

Understandably, this is not the first time I have heard out-of-clubs who start in a blaze of enthusiasm and disappear within a month or so. My experience is probably shared by hundreds of other computer owners whose eagerness is blunted by being ripped off in a similar fashion.

I can only suggest that your readers think twice before parting with their cash, particularly if the publication is not available at a newsagent like your own magazine.

David Jackson, Luton

It would be convenient to readers that they check out the existence of computer clubs in their area before parting with any money. If you have any reason at all to doubt the reliability of a club then don't send any money. KPCD is probably the most well known Commodore club and they may be able to give you information as to specific groups in clubs which they have checked out themselves. Contact: KPCD, 28 Broadwater Road, Newbury Park, Leyton, Essex E17 7EP.

# Double Print

If you want to attract someone's attention to something, then the bigger the better. This ability allows you to use double height characters as a C64.

By Bruce Danner

**W**hen printing text on the screen of a Commodore 64 you are normally stuck with the standard small size character set. Should you require to attract someone's attention to a piece of text then you can change the colour, reverse it etc.

This program, for the C64, makes it possible to highlight your text with double size characters (16x16) adding a more dimension to your text characters.

The program is written entirely in machine code. The version printed here is presented in the form of a Basic loader which POKES the machine code and the new character set into memory.

Also printed here is a demonstration program which is automatically loaded by the machine code loader.

100

This program makes it possible to have both the new expanded character set and the normal C64 character set on screen at any one time. Switching between the two character sets is extremely easy. Insert a CONSTHIL-D character into a print statement and the next will appear in double size print. A CONSTHIL-N character will return things to normal. The demonstration program makes this a little clearer.

The machine code program has four sections:

a) A machine code routine that turns off the interrupt, writes in the new vectors for the double height program and moves the new character set from \$0000 to \$1000.

It The new interrupt routine. This looks for raster interrupts at predefined lines that correspond to the text lines. When the interrupt occurs the character set and text raster lines are set.

c) The new print routine. This first establishes that output is to the screen, then it fixes the character set and outputs using the C64's KERNAL print routine.

d) The new character set. This is initially stored at PC30 to SC30.

and may be reading it.

The whole program can be saved as a machine code routine from \$C000 to \$CA00 provided that any program that uses it moves the start of RAM up to \$B000. Use SYS-49152 to start the conversion.

www.IBM.com/DB2/DB2UML



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www.nature.com/scientificreports/ | (2022) 12:1030 | Article number: 1030

# Contributions

*So you own a Commodore? So you've written some programs? So why haven't you sent them to us?*

**Y**our Commodore is always on the look out for new programs, hints and tips, articles and even regular series. In fact if you have something that you think could be of use to other Commodore owners we want to hear about it.

So if you have got something which you think we may be interested in, how do you go about submitting it to us?

Below you will find a list of guidelines that will help us to deal with any item that you send in to us. We don't expect everybody to be the next William Shakespeare but if you do follow these simple rules then it will make our job a lot easier.

1) If possible all material sent to the magazine should be typed or printed out on a computer printer.

2) All text should be double spaced i.e. there should be a blank line between each line of text. You should also leave a margin of about 10 characters around the text.

3) On the very first page you should put the following:

Name of the article  
Machine that it is for  
Any extra required - disk, printer etc.  
Your name  
Your address  
Your telephone number

4) The top-of-story page should have the following information on it:  
Abbreviation of the article title  
Your name  
The page number

For example, suppose you had submitted an article on C64 interrupts. You should put something like the following at the head of the page:

Interrups/G.Smith/v1

5) Please make sure that you do not make any additional marks on your text especially underlining.

6) Try and write in clear concise English. It does not have to be a work of literature but it must be comprehensible.

7) On the bottom of each page you should put the word MORE if there are more pages to the article or END if it is the last page.

8) If possible, enclose a listing of all programs.

9) Under no circumstances use a staple to hold the pages together. Use a paperclip instead.

10) Programs should be included on either disk or tape. Make sure that you SAVE two copies of every program so that we have a better chance of loading them if problems occur.

11) Programs under 10 lines can be included in the text. If your program is longer than this you must enclose a disk or cassette.

12) If your article needs any artwork then supply clear examples of what is needed. We don't expect you to be an artist but we do need to see what is required.

13) Photographs, if necessary, must be either black and white prints or colour slides. We can take shots ourselves so don't worry about this too much.

14) Submissions of any length are welcome. If you have a five line rhyme that you think may be of use to someone else we welcome it just as much as a full blown six part series.

15) Payment varies quite a lot and depends on quite a number of factors, such as complexity of program, presentation of program, number of magazine pages it takes up etc. Payment is generally between £10.00 and £80.00.

16) All payments are made in the month that the magazine containing your article has appeared in print.

17) If we do find your submission suitable for inclusion in the magazine we will write to you giving the terms of publication, the rate of payment and an agreement form. Payment return of this form will allow us to use your program as soon as possible.

18) If you want the program returning to you, should we find it unsuitable for publication, then you should enclose a stamped self addressed envelope.

19) The last and most important point to make is 'get writing'. We are waiting for your articles.



# Listings

*Get it right first time with our deluxe program system  
for the C64.*

You may have noticed that our listings are free of those horrible little black dots which send you searching around the keyboard for a suitable graphic symbol. You may also have noticed the funny numbers by the side of each line of the listing. First no more, it's all part of our easy entry aid.

Instead of those many graphical rows of countless spaces in PRINT statements and strings we use a special coding system. The code, or mnemonic, is always contained in square brackets and you'll soon learn to decipher their meanings.

For example, [SA] would mean type in a Shifted A, or an set of spaces in layman's terms, and [SA10] would mean a row of ten of those symbols.

[SH2] means hold down the shift key and press the plus key twice. It doesn't take a great leap of logic to realise that [C+1] means exactly the same thing except that the Commodore key (bottom left of the keyboard) is held down instead of the shift key.

If more than two spaces appear in a statement than this will be printed as [SPC4] etc., correspondingly, [SPC24]. Translated into English this means press the spacer four times or in the latter case hold the shift key down while you do it.

A string of special characters could appear as:

[CTRL N, DOWNLEFT, BLUE, FA,C3]

This would be achieved by holding

down the CTRL key as you press N, press the cursor key down twice, the cursor left key five times, press the key marked BLUE while holding down the CTRL key, press the F3 key and, finally hold the Commodore key down while pressing the number two key (C2 would of course make the computer print a brownie).

Always remember that you should only have a row of graphics characters on your screen with no square brackets and no commas, unless something like this appears:

[SH1][C1]

In this case the two characters should have a comma between them.

The rare occasions [REV T] will appear in a listing. This is a delete symbol and is created by entering the line up to this mnemonic. Then type a closing quotation mark ([QUOTE]) & 21 and delete it. This gets the computer out of quote mode. Hold down CTRL and press the number nine key ([RSOFN]), type the relevant number of inverted T's and then hold down CTRL and press zero ([RSOFF]). Next type another quotation mark and delete it again. Now finish the line and press RETURN.

A list of these special cases is given in the table but remember that only one of these mnemonics will appear outside of a PRINT string; the symbol for pi. This may appear when its value is needed in a calculation so this may look something like:

:OC=PI(Pi)?;

Ignore the square brackets and just type in a shifted upward pointing arrow (ie. the pi symbol).

#### PRINTING GRAPHICS

S 100 PRINT "GRAPHICS - C64 IN BASIC"
10 LET I=10 : LET J=100 : LET K=100
20 FOR I=10 TO 100:FOR J=10 TO
30 FOR K=10 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
40 FOR I=11 TO 100:FOR J=11 TO
50 FOR K=11 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
60 FOR I=12 TO 100:FOR J=12 TO
70 FOR K=12 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
80 FOR I=13 TO 100:FOR J=13 TO
90 FOR K=13 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
100 FOR I=14 TO 100:FOR J=14 TO
110 FOR K=14 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
120 FOR I=15 TO 100:FOR J=15 TO
130 FOR K=15 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
140 FOR I=16 TO 100:FOR J=16 TO
150 FOR K=16 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
160 FOR I=17 TO 100:FOR J=17 TO
170 FOR K=17 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
180 FOR I=18 TO 100:FOR J=18 TO
190 FOR K=18 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
200 FOR I=19 TO 100:FOR J=19 TO
210 FOR K=19 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
220 FOR I=20 TO 100:FOR J=20 TO
230 FOR K=20 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
240 FOR I=21 TO 100:FOR J=21 TO
250 FOR K=21 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
260 FOR I=22 TO 100:FOR J=22 TO
270 FOR K=22 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
280 FOR I=23 TO 100:FOR J=23 TO
290 FOR K=23 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
300 FOR I=24 TO 100:FOR J=24 TO
310 FOR K=24 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
320 FOR I=25 TO 100:FOR J=25 TO
330 FOR K=25 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
340 FOR I=26 TO 100:FOR J=26 TO
350 FOR K=26 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
360 FOR I=27 TO 100:FOR J=27 TO
370 FOR K=27 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
380 FOR I=28 TO 100:FOR J=28 TO
390 FOR K=28 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
400 FOR I=29 TO 100:FOR J=29 TO
410 FOR K=29 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
420 FOR I=30 TO 100:FOR J=30 TO
430 FOR K=30 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
440 FOR I=31 TO 100:FOR J=31 TO
450 FOR K=31 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
460 FOR I=32 TO 100:FOR J=32 TO
470 FOR K=32 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
480 FOR I=33 TO 100:FOR J=33 TO
490 FOR K=33 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
500 FOR I=34 TO 100:FOR J=34 TO
510 FOR K=34 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
520 FOR I=35 TO 100:FOR J=35 TO
530 FOR K=35 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
540 FOR I=36 TO 100:FOR J=36 TO
550 FOR K=36 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
560 FOR I=37 TO 100:FOR J=37 TO
570 FOR K=37 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
580 FOR I=38 TO 100:FOR J=38 TO
590 FOR K=38 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
600 FOR I=39 TO 100:FOR J=39 TO
610 FOR K=39 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
620 FOR I=40 TO 100:FOR J=40 TO
630 FOR K=40 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
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650 FOR K=41 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
660 FOR I=42 TO 100:FOR J=42 TO
670 FOR K=42 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
680 FOR I=43 TO 100:FOR J=43 TO
690 FOR K=43 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
700 FOR I=44 TO 100:FOR J=44 TO
710 FOR K=44 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
720 FOR I=45 TO 100:FOR J=45 TO
730 FOR K=45 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
740 FOR I=46 TO 100:FOR J=46 TO
750 FOR K=46 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
760 FOR I=47 TO 100:FOR J=47 TO
770 FOR K=47 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
780 FOR I=48 TO 100:FOR J=48 TO
790 FOR K=48 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
800 FOR I=49 TO 100:FOR J=49 TO
810 FOR K=49 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
820 FOR I=50 TO 100:FOR J=50 TO
830 FOR K=50 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
840 FOR I=51 TO 100:FOR J=51 TO
850 FOR K=51 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
860 FOR I=52 TO 100:FOR J=52 TO
870 FOR K=52 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
880 FOR I=53 TO 100:FOR J=53 TO
890 FOR K=53 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
900 FOR I=54 TO 100:FOR J=54 TO
910 FOR K=54 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
920 FOR I=55 TO 100:FOR J=55 TO
930 FOR K=55 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
940 FOR I=56 TO 100:FOR J=56 TO
950 FOR K=56 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
960 FOR I=57 TO 100:FOR J=57 TO
970 FOR K=57 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR
980 FOR I=58 TO 100:FOR J=58 TO
990 FOR K=58 TO 100:PRINT I,J,K:ENDFOR:ENDFOR:ENDFOR

by Eric Doyle

## Checksum Program

The hexadecinal numbers appearing in a column to the left of the listing should not be typed in with the program. These are merely checksum values and are there to help you get each line right. Don't worry if you don't understand the hexadecinal system, as long as you can compare two characters on the screen with the corresponding two characters in the magazine you can use our line checking program.

Type in the Checksum Program, make sure that you've not made any mistakes and save it to tape or disk

immediately because it will be used with most of the present and future listings appearing in Your Computer.

At the start of each programming session, load Checksum and run it. The screen will turn brown with yellow characters and each time you type in a line and press the RETURN key a number will appear on the screen in white. This should be the same as the corresponding value in the magazine.

If the two values don't relate to one another, you have not copied the key exactly so print out to go back and check each character carefully. When you find the error simply correct it and

press RETURN again.

If you want to turn off the checker simply type STS-49052 and the screen will return to the familiar blue colours. You can then do whatever it was you wanted to do and if this doesn't use the area where Checksum has you can go back to it with the same STS command.

No system is foolproof but the chances of two errors cancelling one another out are so remote that we believe our listings are more reliable than any other magazine in the world. So get typing!

Mnemonic	Symbol	Keypress
[RIGHT]		CTRL left/right
[LEFT]		SHIFT & CTRL left/right
[DOWN]		CTRL up/down
[UP]		SHIFT & CTRL up/down
[F1]		F1 key
[F2]		SHIFT & F1 key
[F3]		F2 key
[F4]		SHIFT & F2 key
[F5]		F3 key
[F6]		SHIFT & F3 key
[F7]		F4 key
[F8]		SHIFT & F4 key
[HOME]		CUR/HOME
[CLR]		SHIFT & CLR/HOME
[RSVON]		CTRL & 9
[RSVOFF]		CTRL & 0

Mnemonic	Symbol	Keypress
[BLACK]		CTRL & 1
[WHITE]		CTRL & 2
[RED]		CTRL & 3
[CYAN]		CTRL & 4
[PURPLE]		CTRL & 5
[GREEN]		CTRL & 6
[BLUE]		CTRL & 7
[YELLOW]		CTRL & 8
[POUND]		£
[LARROW]		←
[RPARROW]		→
[P1]		SHIFT & §
[INST]		SHIFT & INST/DEL
[REV T]		RE REV
[Clear]		CBS + later
[Sletter]		SHIFT + later





Ooops!

**T**here is a slight correction required in our Ben Day Easy program, published March 1987 Your Computer. This only needs to be changed if the start address ends in a one or 0001. Line 663 at present reads:

CH=CH+CA\$8

The correct version should in fact be:  
CH=CH+CA\$8

We hope that this will sort out any problems which you may have encountered whilst using this listing.

Adrian Antles

*The Growing Pains of Adrian Antles*, is not only a popular book and TV series it is claimed also to enter the world of computer games published by Virgin Games. If you're already currently experiencing the hell of adolescence known as your teens, then you may find a bit to identify with in this comedy game. If you left this phase of your life behind a long time ago, then it may serve to refresh your memory.

The game has been programmed by Level 8 in conjunction with Atlantic Publishing and will be available for the C64/128 at £9.99.

This month we've decided to run a caption competition in connection with Adrian's growing pains so have a good look at the accompanying picture (published courtesy of Thames Television) and see if you can come up with an apt witty caption to describe Adrian's obvious domestic bliss. The best caption will win £5.



### Bag Finder

At Your Computer, we try to publish high quality programs that are of benefit to as many readers as possible. This generally means that the programs are often very large and can be prone to typing errors. In order to make your task a little easier, we run a Bag Finder service.

If you have typed in one of our programs and despite much checking, you still can't get the program to run, then send us the following:

Two copies of your program on tape or disk.

A description of your problem.  
If possible, a listing of your work (you may omit this).

A stamped, self addressed envelope for

return of the program to you.

Should any of the above be missing then we will not be able to deal with your query.

We will try to point out where you have made any errors and place a corrected copy of the program back on to your tape or disk before we return it to you.

Do not send a program to us as soon as it stops working. Check it yourself first, if you don't, it only wastes valuable time that could be spent working on the magazine.

We do get a large number of queries in the office, so it may take a little time for yours to be processed. Note: We can only deal with problems concerning programs published in Your Computer.

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Assistant Editor: Marie Corry

Editorial Assistant: Steven Kirkham

Senior Advertising Manager: Peter Chandler

Advertisement Copy Control: Laura Champion

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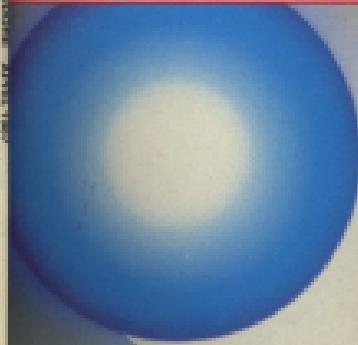
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